The Alberta Journal of Educational Research

Volume XIX, No. 4 *December, 1973*

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FACULTY OF EDUCATION
The University of Alberta

The Alberta Journal of Educational Research *Vol. XIX, No. 4, December, 1973*

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Socio-Psychological Correlates of Non-Medical Use of Drugs Among University Students

The contents of this article are improved and extended excerpts from a larger study "The Resident Student: A Study of Student Opinions and Reactions" completed by the author at The University of Alberta. The study was conducted on the Lister Hall resident student population in 1969-70 (and replicated in the following year) with a view to elicit student reactions to a broad range of social, cultural and educational issues including the non-medical use of drugs among students. The present article is written with three chief objectives in view: (1) To provide a general description of student involvement in drug usage, (2) To isolate factors significantly associated with drug-use, and (3) To detect those which contribute maximally to it. Two questionnaires and a personality inventory were used in the collection of data which were obtained from a stratified random sample of 282 respondents (17% of the resident population in Lister Hall complex). (Dr. Mehra is Research Director, Office of Institutional Research, The University of Alberta).

Introduction and Purpose

Few campus issues today concern the public and the intellectual community so deeply as the recent phenomenal increase in the non-medical use of drugs on university campuses. The public is naturally concerned to find out how pervasive the use of drugs is; that is, the extent, the frequency, and the conditions under which today's young people are taking drugs. The intellectual community is attempting to investigate who these young people are, the nature of their family background, their social and educational values and their personality disposition. At the heart of the issue are questions concerning conditions which contribute to the use of drugs and the role the university community should play in alleviating some of these conditions. The present article is an attempt to provide some partial answers to these questions. More precisely, this article is written with the following three chief objectives in mind: (1) To provide a general description of student involvement in the non-medical use of drugs; (2) To isolate

factors significantly associated with the use of drugs; and (3) To identify and detect factors which contribute to drug usage among students.

The contents of this article are improved and extended excerpts from a larger study "The Resident Student: A Study of Student Opinions and Reactions" completed by the author. This study was designed to collect and analyze student reactions on a broad range of social, cultural and educational issues including the non-medical use of drugs. The study was conducted on the Lister Hall residence student population in 1969-70 and was replicated the following year to check the reliability of the obtained results. The text of this article is based on the 1969-70 survey, with comments on the 1970-71 survey interpolated in parentheses wherever deemed necessary or appropriate.

Design for the Study

Two questionnaires and a personality inventory were used to collect data for the study. The information elicited was, for the most part, biographical and attitudinal. *Questionnaire 1* contained items concerning students' background characteristics, educational aspirations and achievement patterns. *Questionnaire II* was designed to elicit information of a personal and confidential nature, and included items on a broad range of social and educational topics. The *Personality Inventory* used was the 16PF Form A (1962) as developed by Raymond B. Cattell and Herbert W. Eber at the Institute of Personality and Ability Testing.

A stratified random sample of 282 persons (approximately 17% of the total residence population) was selected. Stratification was by sex and year of studies. Subjects were reassured regarding the anonymity of their answers and their identification was not required. A total usable response of 83% was obtained—a reasonably high response for the purposes of analysis.

Since the first two sections of this study were meant to be essentially descriptive, the data for these parts were analysed in the form of frequency distributions. To test the statistical significance of differences in two or more distributions, mostly the chi-square test for contingency was used. Generally speaking, only those items are included in the text of this paper, where the differences in two or more distributions were found to be significant at least at the 5% level. A few items which do not meet this criterion are nevertheless included in the text, since they indicate some interesting patterns or relationships. The methodology employed in the third section of this study is described and discussed along with the results.

Findings of the Study

I. General Description

A drug-user in this article is defined as a person who uses drugs without prescription on an experimental, occasional or regular basis.

Use of drugs other than alcohol and tobacco among resident students seems to be limited essentially to experimental sessions only, with regular use restricted to a small minority. One quarter (31.5% in the 1970-71 survey) reported using "soft-drugs" (marijuana, cannabis, hashish etc.)

during the preceding six months, 11% using them only once or twice. The pattern is more or less the same for sedatives, tranquilizers and amphetamines. The pattern for "hard-drugs" (LSD, opiates, heroin, and other hallucinogens) is quite different: only 2% reported having tried them. On the other hand, the level of general information on drugs was rather high (e.g., they knew the price of a "dime bag"). The largest group of drug contacts was residence friends (48% in 1969-70, up to 58% in 1970-71, reflecting increased availability).

Alcohol is obviously much more widely accepted than other drugs. While only a third reported using tobacco, 69% reported drinking once or twice a week. More than half of their consumption was in the residence halls. There was general support for lowering the drinking age to 18 years (The legal age was lowered to 18 in Alberta in 1971).

These results agree with the consistent trend of a number of studies. For example, Pearlman (1968) surveying graduates of Brooklyn College between 1962 and 1965, found that only seven percent had some illicit drug experience. Later, Eells (1968) found that 13.7 percent of all students at Cal Tech had used marijuana and 5.5 percent had used LSD. Imperi, Kleber, and Kavie (1968) in a similar study at Yale and Wesleyan found that 20 percent at both institutions had used hallucinogenic drugs. A study completed at McGill in 1970 found 29.5 percent of the students had smoked marijuana. In 1971, Kohn and Mercer found 50 percent at York.

Although most students who have used drugs have done so only infrequently, students in general seem to be aware of the drug culture and cognitive of its attributes. That this is so is indicated by their knowledge of colloquialisms and drug sources.

Contrary to the general belief, marijuana does not seem to be a substitute for alcohol, its users tending to be multiple drug users who look upon marijuana as "somewhat safe", alcohol as "less so", and tobacco as "somewhat unsafe".

Those who use drugs without a prescription do so to "feel good", or because of curiosity. They cite "awareness" as their dominant marijuana experience and "transcendence" as their dominant LSD experience.

Most respondents advocate some kind of restriction on the availability of marijuana. Most thought that LSD should be available for research purposes only.

They would "warn" their children if they found them smoking marijuana, and seek "clinical help" for a child on LSD. They tend to view people addicted to heroin as "sick".

Mass-media were reported as having the strongest influence on their attitudes towards the use of drugs. The information thus gained tends to be used to defend arguments for or against the safety of drugs.

II. Relationships

Background: Although the sample of "hard" drug users was too small to support definite conclusions, the sample of "soft" drug users was adequate to support a number of observations. The variables "sex" and "year of studies" appear to be significant factors ($p < .05$): significantly more men than women, and more freshmen than third or fourth year

students reported using drugs (cf. Eells, 1968). However, it should be noted that senior students are more highly selected than freshmen. The incidence of use was reported highest for the Faculty of Arts (as also found in the McGill study, 1970, and at Sir George Williams, 1969), and for Business Administration and Commerce, and lowest for Agriculture and Education in that order. Family socio-economic level was also found to be a significant factor: more drug users' fathers were in professional occupations, father's formal educational level was that of university level, and parental income was $10,000 to $25,000. These results also agree with others (Stef-

TABLE 1
BACKGROUND FACTORS RELATED TO DRUG USAGE

	Users (N=61)	Non-Users (N=171)	Total
Sex			
Male	37.7	62.3	50.5
Female	25.2	74.8	49.5
	Observed χ^2 value (1 d.f.)=4.96, P. < .05		
Socioeconomic Variables			
Father's Occupation?			
Professional	58.2	33.5	40.0
Proprietor	14.5	26.5	23.3
Clerical	10.9	12.3	11.9
Skilled	12.7	15.5	14.8
Semi-skilled	3.6	12.3	10.0
	Observed χ^2 value (4 d.f.)=11.91, P. < .02		
Father's Education?			
Under 6 years	32.8	45.2	41.9
High School	26.2	33.3	31.4
Graduate Work	9.8	7.1	7.9
1-3 years of University	31.1	14.3	18.8
	Observed χ^2 value (3 d.f.)=9.56, P. < .03		
Parents' Annual Income?			
Under $10,000	37.9	51.6	47.9
$10,000 - $25,000	56.9	39.1	43.8
Over $25,000	5.2	9.3	8.2
	Observed χ^2 value (2 d.f.)=5.61, P. < .06		
Financial Support for University Education			
Parents	43.2	36.4	38.2
Job	27.7	30.2	29.6
Loan	16.1	19.3	18.5
Grant or Scholarship	12.9	14.1	13.8

fanhagen et al., 1971; the McGill study, 1970; Sir George Williams, 1969) in that respondents' concept of God seemed a related factor ($p < .02$): more users than non-users were undecided about their concept of God. Greater "secularity" has also been a finding of a number of other studies on drug users (e.g. Kohn and Mercer, 1971; Milman and Anker, 1971). Sibling marijuana use was much higher for the users than the non-users ($p < .01$, Table 1).

Educational Aspirations: These drug users show an above average Grade XII Grade Point Average but scored lower in University ratings of achievement (*cf.* the McGill study, 1970). They reported studying fewer

TABLE 1 (continued)
BACKGROUND FACTORS RELATED TO DRUG USAGE

	Users (N=61)	Non-Users (N=171)	Total
Year of Studies			
Freshmen	62.5	44.4	49.1
Juniors	28.6	35.2	33.5
Seniors	8.9	20.4	17.4
	Observed χ^2 value (2 d.f.)=6.43, P. < .05		
Faculty			
Agriculture	3.3	8.3	7.0
Arts	29.5	13.6	17.8
Business Administration & Commerce	8.2	4.1	5.2
Education	13.1	24.3	21.3
Engineering	9.8	13.6	12.6
Household Economics	6.6	5.3	5.7
Medicine	8.2	10.7	10.0
Science	21.3	20.1	20.4
	Observed χ^2 value (7 d.f.)=12.92, P. < .10		
Concept of God			
What is your Concept of God?			
Supreme Being	49.2	66.3	61.7
Does not Exist	1.6	6.5	5.2
Undecided	32.8	19.5	23.0
Other	16.5	7.7	10.0
	Observed χ^2 value (3 d.f.)=10.97, P. < .02		
Sibling Marijuana Usage			
Siblings taking Marijuana or Glue?			
Marijuana	19.0	7.6	10.6
Never Used Marijuana or Glue	48.3	76.6	69.0
Don't Know	32.8	15.8	20.4
	Observed χ^2 value (2 d.f.)=16.05, P. < .01		

hours ($p < .05$), doing more free reading, spending more time watching T.V., and dating more frequently than non-users (*cf.* Milman and Anker, 1971). Though the figures are not always statistically significant, drug-users seem to give more weight to the importance of acquiring wider interests than scholarship as a part of university education; to be reasonably satisfied with their education at the university; but to be undecided about their future educational and career plans ($p < .01$).

Social Attitudes: Significantly more users than non-users regard marriage as a temporary or a communal situation; consider female virginity either unimportant or undesirable, prefer women as well as men to be sexually experienced when they marry; and are sexually more active (Table 2).

Personality Characteristics: The Lister Hall student population, both male and female, was found to be highly representative of the college student population in Alberta in respect of personality characteristics. The profiles for the drug-users, however, differed significantly from those of the non-users on two of the factors of the personality inventory, indicating the drug-users to be more "expedient" individually (G-;$p < .001$) and "undisciplined" socially (Q3-;$p < .05$) than the non-users. Thus, the user is characterized by a freedom from group influence that sometimes leads to antisocial acts, a refusal to be bound by rules, a disregard for social demands, inconsiderate carelessness and impulsiveness. The regular user may also feel that he is emotionally maladjusted.

Male users indicate a happy-go-lucky, impulsive, enthusiastic attitude not displayed by female users (F-;$p < .05$). Male users have a forthright, unsophisticated, simple and spontaneous attitude towards life (Factor N). Female users tend to be imaginative, bohemian and careless of practical matters (Factor M). These findings are substantiated by comparing the reactions of the users and non-users to residence policies and regulations. Responses of drug users in this area consistently favoured a liberal, unstructured and undisciplined life in the residence.

These findings on student drug-involvement are in substantial agreement with the findings of studies on student drug-involvement on other Canadian and American campuses.

III. Predictors of Marijuana Usage

To delineate predictors of marijuana usage, 70 biographical and personality variables were selected and factor analyzed using the principal component method. The factor-matrix produced 24 factors with eigenvalues greater than unity. These factors accounted for 68% of the total variance among the variables. In addition, the communalities of the variables were quite high (usually over 0.7) indicating that most of the variance of the 70 variables was accounted for by 24 factors. Factor scores for each of the 521 subjects (subjects for the two surveys were combined for this phase of the study) were calculated. The factors were then assessed as predictors of marijuana usage using the simultaneous regression analysis technique.

Twenty-one percent of the variance in marijuana usage was predicted. This is a relatively small amount but considering that this battery of variables was not put together with this in mind, the results are not discouraging. Four factors were found to be particularly relevant to high drug

TABLE 2
VARIABLES RELATED TO ACHIEVEMENT

	Users (N=61)	Non-Users (N=171)	Total (N=232)
Grade Point Average (Grade XII):			
59 - 69	32.8	45.8	42.4
70 - 80	47.5	33.3	37.1
Over 80	19.7	20.8	20.5
Study Hours:			
1 - 5 hrs.	45.9	21.1	27.6
6 - 10 hrs.	21.3	28.1	26.3
10 - 20 hrs.	23.0	35.7	32.3
Over 20 hrs.	9.8	15.2	13.8
	Observed χ^2 value (3 d.f.) = 14.03, P. < .05		
Number of Books Read:			
None	8.2	23.4	19.4
1 - 5	60.7	51.5	53.9
6 - 10	13.1	13.5	13.4
10 - 20	6.6	7.6	7.3
Over 20	11.5	4.1	6.0
	Observed χ^2 value (4 d.f.) = 10.19, P. < .05		
T.V. Hours:			
None	9.8	22.2	19.0
1 - 5 hrs.	52.5	45.6	47.4
6 - 10 hrs.	19.7	22.2	21.6
11 - 15 hrs.	11.5	5.8	7.3
Over 16 hrs.	6.6	4.1	4.7
Dating Frequency:			
Several/week	41.0	31.0	33.6
Once/week	37.7	32.1	33.6
Once/month	13.1	19.6	17.9
Once/years	8.2	17.3	14.8
December Exam Grade Point Average:			
8 & above	6.7	7.8	7.5
7	15.0	22.9	20.8
6	40.0	37.3	38.1
5	28.3	25.3	26.1
4 or less	10.0	6.6	7.5
Enter Graduate Studies:			
Yes	26.2	25.1	25.4
No	18.0	39.8	34.1
Undecided	55.7	35.1	40.5
	Observed χ^2 value (2 d.f.) = 10.99, P. < .01		

usage; namely high "liberalism", high "secularity", low "academic responsibility" and high "vertical mobility". In terms of the original variables, these results point out that these residence drug users are less moralistic, more impersonal and alienated in their view of God, more likely to endorse the "have a good time and get by" attitude towards university education (a motivational syndrome suggesting low academic aspirations), and less likely to come from a family in which the father is semi-skilled and the mother employed. In addition, as shown in the attached table, the following factors were also found relevant: registration in non-science and non-engineering disciplines, low extraversion, low student leadership,

TABLE 3
ATTITUDES TO SEX AND MARRIAGE

	Users (N=61)	Non-Users (N=171)	Total (N=232)
Concept of Marriage:			
Legal contract	21.3	29.6	27.4
Religious bond	36.1	42.6	40.9
Trial marriage	16.4	5.9	8.7
Communal Living	6.6	1.8	3.0
Other	19.7	20.1	20.0
	Observed χ^2 value (4 d.f.) = 10.62, P. < .05		
Should a woman be a virgin when she marries:			
Preferably	31.1	64.7	55.8
Unimportant	57.4	34.7	40.7
Preferably not	11.5	0.6	3.5
	Observed χ^2 value (2 d.f.) = 30.09, P. < .001		
Should a man be a virgin when he marries?			
Preferably	21.3	42.0	36.5
Unimportant	41.0	46.2	44.8
Preferably not	37.7	11.8	18.7
	Observed χ^2 value (2 d.f.) = 21.57, P. < .001		
Engaged (during the past six months) in sexual intercourse:			
Yes	45.0	20.5	26.8
No	55.0	79.5	73.2
	Observed χ^2 value (1 d.f.) = 12.39, P. < .001		

high anxiety, high T.V. watching and free reading, and the attitude that residences are too noisy (Table 3). Thus the necessarily truncated view of the drug user resulting from these findings is that of a relatively more anxious and introverted person.

IV. Conclusion and Implications

The above findings are only suggestive and make possible only limited conclusions. Nevertheless, they point out a very important dimension on which drug users differ sharply from the non drug users, namely, the attitudinal temperamental dimension. One may, in fact, opine that these differences reveal quite distinct paradigms of belief systems of the two groups. If this is so, it would be very relevant to map such paradigms and examine their relationship to behavior patterns. The fact that marijuana usage is predictable from a certain belief system suggests the efficacy of this strategy.

These findings seem to have relevant implications for the Office of Student Affairs in general, and student counselling services in particular, in pointing out that drug-usage may be one way in which more anxious, introverted, and academically less ambitious students respond to the stresses of university life. These offices can then devise steps which should be taken to alleviate some of the stressful conditions.

As pointed out earlier, the original variables used in this study were

TABLE 4
PERSONALITY CHARACTERISTICS

	Males		Females	
	Users	Non-Users	Users	Non-Users
Sober vs. Happy-go-lucky:				
Low	18.5	47.9	14.7	11.2
Average	25.9	17.8	41.2	39.8
High	55.6	34.2	44.1	49.0
	Observed χ^2 value (2 d.f.) = 7.15, P. < .05			
Expedient vs. Conscientious:				
Low	74.1	34.2	52.9	26.5
Average	22.2	38.4	23.5	35.7
High	3.7	27.4	23.5	37.8
	Observed χ^2 value (2 d.f.)=13.73, P. < .001		χ^2 (2 d.f.)=7.93, P. < .02	
Practical vs. Imaginative:				
Low	18.5	32.9	14.7	23.5
Average	40.7	37.0	26.5	39.8
High	40.7	30.1	58.8	36.7
			χ^2 (2 d.f.)=5.05, P. < .10	
Forthright vs. Shrewd:				
Low	55.6	31.5	38.2	36.7
Average	25.9	42.5	50.0	43.9
High	18.5	26.0	11.8	19.4
	Observed χ^2 value (2 d.f.)=4.88, P. < .10			
Undisciplined vs. Controlled:				
Low	66.7	37.0	70.6	46.9
Average	22.2	37.0	26.5	38.8
High	11.1	26.0	2.9	14.3
	Observed χ^2 value (2 d.f.)=7.15, P. < .05		χ^2 (2 d.f.) =6.59, P. < .05	

not selected 'ad hoc". A study specifically addressed to the putative drug use predictors is warranted before some definite conclusions can be drawn. Moreover, in the present study, different categories of drug users, namely, experimenters and those who use drugs on occasional as well as regular bases, were all combined (since the number of subjects falling in each category was too small for any meaningful analysis) for purposes of analysis. This may have blurred the results, especially those in the area of prediction analysis. Separate analyses of drug-users falling in different categories may lead to sharper and more illuminating findings.

This study was conducted on a typical student population, namely, resident students. Since residences are (or are at least considered to be) less congenial to the use of drugs, the findings of this study cannot be generalized to the total campus student population. A similar study addressed to the general student population is necessary before some definite and more general conclusions can be drawn.

It was not possible to investigate the causal relationship between the use of drugs and belief systems, that is, whether use of drugs inevitably leads to the changing of indoctrinated belief systems about drugs, or

TABLE 5
ANALYSIS OF VARIANCE: DIFFERENCES BETWEEN DRUG-USERS (MARIJUANA) AND OTHERS (N=521)

Factor	F Value	Probability Level
Liberalism (variables include disavowal of male or female virginity before marriage, and more dating and sex)	32.454	<.005
Secularity (irreligious concept of God, low church attendance)	31.164	<.005
Low academic responsibility (little studying, high proportion of drinking in residence, avowal of the "have a good time" ethic)	19.161	<.005
High "vertical mobility" (mother does not work, father in professional occupation, university level education, high annual income)	12.591	<.005
Not quiet in residence	12.339	<.005
Non-Engineering faculty	9.707	<.005
Non-Science faculty	9.632	<.005
Low extraversion (16 P.F. variables A+, E+, F+, H+, Q_2-)	8.783	<.005
Low student leadership (low student government participation, younger age, 1st and 2nd year of studies)	8.721	<.005
High amount of T.V. watching or free reading	6.518	<.025
High anxiety (16 P.F. variables C-, L+, O+, Q_4+)	3.390	<.10

liberal belief systems lead to the use of drugs. Our study underscores the need for a systematic investigation in this area.

Note. Section III of this paper is largely based on a study by D. Wardell (Oct., 1971) which has been recently revised and summarized, See, Wardell, D. and Mehra, N. "A note on the prediction of marijuana usage among students in a university residence", Center For Advanced Study in Theoretical Psychology, Advanced Publication Report No. 131A73, The University of Alberta, Edmonton, 1973.

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The Alberta Journal of Educational Research *Vol. XIX, No. 4, December, 1973*

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The Technical Standards of Intellective Tests Used in Alberta Elementary Schools: A Review

Forty-seven Alberta school systems responded to a questionnaire by listing the intellective tests used in their elementary school classrooms. A review of the research literature related to these tests was conducted to compare empirically determined estimates of their reliability and validity with accepted standards. Although most of the tests were found to have the support of acceptable estimates of reliability, there was substantial variability in the adequacy of the reliability of the studies reviewed. Very few adequate investigations of the validity of the tests were found, and in most cases the results were far from conclusive in their support. It was concluded that, until they have the support of thorough and systematic evaluations of utility, the continued use of the tests should be with caution. (Dr. Ogston is an Assistant Professor in the Department of Applied Psychology, O.I.S.E.).

Perhaps no other field has experienced the impact of psychological testing more than has education. Objective tests are more readily available for educational classification, selection, and planning than for the purposes of all other fields combined. In their attempts to determine the effectiveness of curricula and instructional practice, to discover and understand learning difficulties, and to plan instruction and motivate learning, many educators turned to objective tests to assist in making these judgments. Since tests offer educators an efficient and economical method of describing and differentiating pupils, evaluating the effects of educational experiences, and detecting pupils for which specialized instruction is required, it is not surprising that objective testing programs gained almost universal acceptance, or that educators devoted extensive amounts of time and energy to the development of psychometric instruments.

When used intelligently, tests may constitute a powerful force in the improvement of the human condition. But, when poor instruments are employed, or good ones used improperly, the effects upon individuals

and society may be harmful. Concern about the social consequences of educational testing is being expressed more and more frequently. For example, Hoffman (1962) has charged that it has led to the labelling of individuals as to abilities and capabilities, that it has perpetuated a limited conception of ability by observing talents in searching for specific abilities; that it has fostered a 'teach-to-the-tests' mentality in lesson planning; and, that it has contributed to mechanistic decision-making about the future of the testee. Rosenthal and Jacobsen's (1968) now classic investigations of the 'self-fulfilling prophecy' effect in the classroom lends credence to charges of teacher-dependence on objective tests. Because the use of standardized tests can mean so much to so many, particularly the pupils, their use must be subjected to constant scrutiny, not just to ensure that they are properly used, but also to determine if they need be used, and, more fundamentally, if those in use are worthy of use.

Tests are used to assist educators in making decisions about their pupils. Sometimes the test is used to confirm what the educator has surmised about his or her pupils through observation of their classroom performance. Other times the educator seeks to understand a child's performance. Each use has its dangers: an unreliable or invalid test shows an exceptional child to be of average ability, a description compatible with the teacher's observations, or a child's poor performance is clarified by a low IQ derived from an equally unreliable or invalid test. Although the teacher acts in good faith, the test-produced distortion is likely to result in educational consequences which are unfair to the child and the educator, and which pervade the child's subsequent education. Such possibilities emphasize the need for educators to be absolutely certain that the tests used in their classroom, particularly at primary and elementary levels, are the best available. What then are the technical characteristics of standardized tests *in use* which commend their use?

Explicit technical standards for tests used in educational settings have been specified (American Psychological Association, 1966) and are generally accepted. However, for a variety of reasons tests may be in use which do not meet these accepted standards. The purpose of the present report was to evaluate, through a critical review of the relevant literature, the technical characteristics of intellective tests which were in frequent use in Alberta elementary schools. Of particular interest was evidence of reliability and validity arising from research conducted with samples of Alberta children within the past decade. Where necessary, research centered on other populations was reviewed and cited.

Method

Survey

To determine which intellective tests were in frequent use in Alberta elementary schools a questionnaire and covering letter were sent to the "Director, Special Educational Services" of 77 Alberta school districts, divisions and counties listed in the Department of Education's *List of operating schools in Alberta: 1970-1971.* Private schools and consolidation districts were not approached. The letter asked the respondents to list on the questionnaire the "intelligence" and "mental maturity" tests most

frequently administered in their system by grade from kindergarten through grade five, and invited comments on the tests reported in use The responses were returned by enclosed, return-addressed, stamped envelopes.

Fifty questionnaires were returned for a return rate of 69.94%. Three respondents reported that intellective tests were no longer administered in their classrooms. Two of the three submitted copies of reports of committees struck to consider the use of standardized tests. Both recommended that standardized testing be *discontinued* at all grade levels within their systems.

TABLE 1
NUMBER OF SCHOOL SYSTEMS REPORTING THE USE OF TESTS

Name and Type of Test		School Grade					
		K	I	II	III	IV	V
Lorge-Thorndike Intelligence Tests	I	3	3	2			
Canadian Lorge-Thorndike			7		12	14	5
Canadian Test of Basic Skills	M			1	10	10	9
Otis Mental Ability Test	I		3	3	9	4	1
Otis-Lennon		1	2	3	4	3	2
Metropolitan Readiness Test	M	8	12	1			
Detroit Beginning 1st Grade Intelligence Test	M	7	6				
Detroit Advanced			2				
SRA Primary Mental Abilities	M		3	3	3		
California Test of Mental Maturity	I	1	2	1	2	1	
Safran Culture Reduced Intelligence Test	I		2	1	1		
IPAT Culture Fair Intelligence Test	I				1		

I - Intelligence M - Mental Maturity

Table I lists all the tests reported in use in rank order according to the frequency of use across the 47 school systems. Also shown is the frequency of use of each test in each school grade from kindergarten through grade five. Of the 12 tests listed in Table I, seven were identified as intelligence tests, and six as tests of mental maturity. Intelligence tests were defined as those which yield intelligence quotients, mental age equivalents, or some deviation score derived from these indices. Mental maturity tests were defined as those which yield an index of testee educational ability or readiness to employ cognitive abilities and skills.

Three tests, the Lorge-Thorndike, Otis, and Detroit, have duplicate representation in Table I. The Canadian Lorge-Thorndike, normed on Canadian samples, is a revision of the original and the Otis-Lennon is a revision of the Otis Quick-Scoring Mental Ability Test. The Detroit Advanced is a graded extension of the Detroit Beginning Intelligence Test.

Procedure

The review was conducted by: (1) searching the professional literature for articles, books, theses, and test manuals which reported investigations of the reliability and validity of each test reported in use; (2) abstracting the reports as to the purpose of the investigation, the sample used, the research design, findings of psychometric utility, and implications; and, (3) determining the correspondence between technical characteristics so identified and accepted technical characteristics. Empirical demonstration of accepted standards was accepted over purported characteristics. *The standards for education and psychological tests and manuals* (American Psychological Association, 1966) provided the criteria against which each test was compared for satisfactory evidence of reliability and validity. Although it was not expected that each test would have the support of all the criteria, the review sought evidence of the following:

1. Estimates of test reliability in terms of stability and internal consistency expressed as:
   (a) variance of error components, or
   (b) standard error of measurement, or
   (c) product moment coefficients.
2. Estimates of stability based upon equivalent forms, including means, variances, and coefficients, or retest, accompanied by a specification of the time period involved.
3. Estimates of consistency based upon Spearman-Brown or Kuder-Richardson formulae.
4. Content validation showing the test to sample the class of situations it is purported to sample.
5. Claims of predictive or concurrent relationships demonstrated by expectancy tables or a correlation relating the test score to a criterion measure (criterion-related validity).
6. Construct validity evidence through demonstration that explanatory concepts or constructs accounted for performance on the test.
7. Discriminative utility evidence through demonstration that the test differentiated between logically related groups.
8. Cross-validation studies supporting basic claims of validity. The tests of intelligence are reviewed separately from the tests of mental maturity to optimize comparisons among tests of each type.

The Review

Intelligence Tests

Of the five group intelligence tests represented as being in use, three, the Lorge-Thorndike Intelligence Tests, the Otis Mental Ability Tests, and the California Test of Mental Maturity (CTMM), are well known and in general use. The Lorge-Thorndike was recently revised as the Cognitive Abilities Test, of which there is a Canadian form. The Otis-Lennon Mental Ability Test is the fourth major revision of the Otis. The other two tests reported in use were designed to provide culture—fair estimates of intelligence. The Safran Culture Reduced Intelligence Test (SCRIT) was standardized on Alberta children. The Culture Fair Intelligence Test (CFIT) represents an attempt to sample Spearman's (1927) general ability

factor "g". Neither test appears to be widely used nor have they been the subject of research.

Reliability. Table 2 summarizes reliability estimates reported for the five intelligence tests, the two forms of the Lorge-Thorndike, and the Otis, each being combined to form one entry. The Lorge-Thorndike has been subjected to the most complete evaluation of reliability with only a stability estimate not reported. All five tests yield acceptable estimates of reliability ranging from moderate to exceptionally high. However, in some instances the estimates reported are inconclusive. Culture fair tests are assumed to be unaffected by experimental and achievement variables and thus retest estimates of reliability simultaneously demonstrate stability and also provide critical construct validation for the robustness of the test. It is unfortunate, therefore, that neither the SCRIT nor the CFIT have retest coefficients reported for them.

TABLE 2
RELIABILITY ESTIMATES

Test	Equivalent Forms	Spearman-Brown	Kuder-Richardson	Test-Retest
Intelligence				
Lorge-Thorndike	.76-.90	.88-.94	.87-.91	
Otis		.85-.93		.87-.94
CTMM		.79		.33-.58
SCRIT			.75-.86	
CFIT		.80		
Achievement or Attainment				
Metropolitan		.85-.94	.85-.95	.89
Detroit		.89-.91	.91	.64-.79
PMA		.84		.84-.94
CTBS (Iowa)		.90		

Conversely, intelligence tests which are assumed to accommodate the acquisition of educational skills may yield spuriously low retest reliability estimates. As a case in point, the retest reliability range of the CTMM shown in Table 2, though significant, is comparatively low. Finley, Thompson and Cognata (1966) calculated retest reliability coefficients for the CTMM-IQ over four years of school (grades 3, 5 and 7). Generally the longer the retest period (four years) the lower the coefficient (r = .33). A one year retest period (grades 3 to 4) produced the highest coefficient (r = .58). Since tests of this type are not assumed to be free of cultural effects, retest reliability intervals become particularly important. An ideal combination is that shown for the Otis in which consistency and

stability (over the year) estimates are highly comparable (Lefever in Buros, 1959, p. 497-499; Smith, 1970).

An additional consideration in weighing the reliabilities of these tests arises from the finding with the Lorge-Thorndike (Freeman in Buros, 1959, p. 479-481), Otis (Smith, 1970), and SCRIT (Safran, 1963) that reliability estimates tend to increase with the age of the sample upon which it is based. Estimates reported here are for children aged about 5 to 11 years. Presumably children beginning school are as heterogeneous a group as they shall ever be again since there is a wide diversity in the kind and amount of intellectual stimulation they have received. The early educational experience probably acts to equalize experiences and thus stabilize intellectual functioning. Use of group intelligence tests with preschoolers or primary grades should only be with the realization that the reliabilities of these tests are subject to question.

Validity. Since group intelligence tests represent an economical method of measuring the general ability of a group, or of an individual in reference to the group, their use is often predicted upon an assumed relationship between general ability and academic performance. Validation of this assumption requires demonstration that they, (1) are measures of general ability, and (2) are related to performance. Content and construct validation provide a solution to the first problem. If the test can be shown logically to sample intelligence then it may be used with some confidence. However, face validity is the least empirical form of content validity. Factor analytic techniques may be used to identify the content areas sampled by the test. However, in the present cases factor analytic demonstrations of content validity are inappropriate since the tests are purported to yield molar estimates of intelligence rather than estimates of specific skills. Thus it was not surprising to find that reported research on content validation was non-existent. Instead the research emphases were upon construct and criterion-related validity.

Two of the five intelligence tests were found to have construct validation studies reported for them, and the studies were conducted with native Canadian children (MacArthur, 1968). An intelligence test which would not discriminate against Eskimo, Indian or Métis children would be one which has a low relationship with socioeconomic status, little dependence on acquired information, and no relationship with school achievement. Factor analysis revealed that this was true of the SCRIT and CFIT (MacArthur and Elley, 1963). In addition, the two tests obtained high loadings on the primary factor identified as general intellectual ability. The authors concluded that these tests provided the best culture fair estimates of intelligence for grades 1 through 8 among native children. This conclusion may be generalizable to other populations as well in view of the finding that socioeconomic status does attenuate intelligence test results (Anderson, 1962; Barker, Schultz and Hinze, 1961). Indeed, Kittell (1964) reported that the language IQ derived from the CTMM is lower for bilingual children until grade 5 than for unilingual children. Findings of these kinds are particularly relevant to northern Alberta schools where there is a cross-section of racial and economic groups.

As might be expected, the five intelligence tests are interrelated. Interestingly however, the intercorrelations, while for the most part

significant, tend to be moderate in the range of r = .40-.70. (Carlson, 1968; Safran, 1963). Certainly correlations of this magnitude provide evidence of concurrent validity, but at the same time suggest that the various tests may very well be sampling quite different abilities. Concurrent correlations with individual intelligence tests were not much more promising. For example, the CTMM total score correlations with the WISC range from 0.43 to 0.77, and 0.43 to 0.56 with the Stanford-Binet (Littell, 1960; Tatham and Dole, 1963; Milholland, in Buros, 1959, p. 314-315). The Lorge-Thorndike has been found to correlate 0.63, 0.54 and 0.71 with the WISC full scale, performance and verbal IQ's respectively and 0.87 with the Stanford-Binet (Freeman, in Buros, 1959, p. 479-481). Finally, Otis correlations with the CTMM have ranged from 0.35 to 0.52 (Burgemeister, Blum and Lorge, 1954). Though demonstrating significant relationships these coefficients are of only moderate magnitude, at most accounting for only about 50 or 60 percent of the measured variance. Clearly, other factors are equally important.

A second index of concurrent ability is based upon the assumption that educational achievement is a function of intelligence; in which case intelligence test scores should be related to measures of academic achievement. At the elementary school level the major academic content areas are reading, arithmetic and language. Using a somewhat small sample of 26 male and 29 female Calgary fourth graders, Frost (1965) correlated SCRIT—measured intelligence with teacher grades and standardized achievement test scores. The correlations between overall teacher grades and the SCRIT were 0.66 for males and 0.62 for females. On the achievement test the correlations were 0.66 and 0.32 for reading and 0.30 and 0.45 for arithmetic. Generally the relationship between the SCRIT and teacher grades was greater than with achievement test scores. Safran (1963) reports SCRIT—grade correlations of 0.52, 0.48, 0.78 and 0.75 for grades 2, 3, 4 and 5 respectively. The general trend seen in these results, increasing validity with successive grades, seems to be the usual case (Ross, 1959).

The Otis has been studied in combination with a representative variety of achievement tests. The resultant correlations have routinely been in the range r = 0.85 to 0.93 (Smith, 1970). For example, when correlated with the Iowa Test of Basic Skills for a grade 5 sample only 5% of the nonerror variance was not accounted for by the resultant coefficients (Grotelueschen, 1969). Although these coefficients are impressive indicators of validity, when the Otis is studied with Alberta children the coefficients are substantially smaller. Fritze (1959) found, with a sample of 125 grade 4 and 5 pupils, a correlation range of 0.40 to 0.58 when the Otis Beta was correlated with subscales of the School and College Ability Test and the Sequential Test of Educational Progress.

One use of intelligence test results is the prediction of academic success, although judging from comments offered by respondents to the questionnaire this is becoming an infrequent use. Mattick (1963) compared the utility of readiness and intelligence tests in the prediction of teacher ratings of grade 1 success. The tests were given five months prior to first registration and the teachers' ratings were obtained the following October. The two readiness tests used correlated 0.56 and 0.45 with teacher ratings

while the two intelligence measures, Lorge-Thorndike and CTMM, correlated 0.37 and 0.31 respectively. Mattick concluded that if predictions were of interest then readiness tests are likely to be better predictors than group intelligence tests.

Mattick's study raises an important methodological issue through his use of teacher ratings rather than teacher assigned grades as the criterion variable. Although teacher ratings would seem to be synonymous with grading, the fact remains that the ultimate criterion is the latter. A case in point is Irvine's (1968) finding that although teacher ratings are the best single predictor of final grades, the actual coefficients ranged from 0.59 to 0.90. Obviously teacher ratings are not equivalent to final grades and thus should not be used as the criterion variable.

In a study which did use teacher assigned grades in reading as the criterion, Hopkins and Sitkei (1969) found that a readiness test, in their case reading readiness, consistently correlated higher with the criterion than did the CTMM. When combined with the readiness test to yield a predictive multiple correlation the CTMM only contributed an additional 0.036 percent of the variance. In addition to supporting Mattick's finding and conclusion, these results suggest that prediction within content areas will probably be best achieved using measures which sample the area. This conclusion is echoed throughout this review.

Conclusion: In general the reliability estimates reported for the five intelligence tests are satisfactory, although in some instances the type of estimate found was not the most appropriate. However, the validity studies reported with the tests are far from conclusive. The equivocality of results underlines the need for carefully conducted validity studies. Because intelligence is such a molar construct encompassing so many abilities it is not enough simply to demonstrate that these tests are related to a variety of abilities or achievements. Content and construct validation studies with these tests are a must and yet are seldom conducted. Users of the tests may be confident that the instruments are reliable, but must also caution their use of them with the awareness that they cannot be certain that the tests are sampling what they are purported to sample.

Mental Maturity Tests

Four tests were reported in use which are purported to indicate the present ability of, or the potential learning rate to be expected of, the testee. The Metropolitan Readiness Tests and the Detroit Beginning Intelligence Test were both devised to measure the extent to which school beginners have developed in the skills and abilities that contribute to readiness for first-grade instruction. The SRA Primary Mental Abilities (PMA) samples essentially the same abilities (verbal, reasoning, space and number) but is designed to be given as the child progresses through school. The Canadian Test of Basic Skills (CTBS) is the Canadian revision of the Iowa Test of Basic Skills.

Reliability: Table 2 summarizes the reliabilities reported for the four tests. As might be expected, since maturity is an age-relative concept, internal consistency estimates are emphasized. That mental maturity is a transitory state appears to be demonstrated in the retest column. Retest coefficients reported for the Metropolitan and PMA are based upon two-

week intervals with entering first-graders (Gardner in Buros, 1949, p. 605-606; Burgess, 1961). Powell (1956) reported a retest coefficient of 0.76 for the Detroit over the first four months of first grade and Cronbach (1960) cites a two-year retest coefficient for the Detroit of 0.64. It is not surprising that a measure of maturity which is related to a restricted age group should not maintain its reliability over a number of years, let alone months. Consequently, except when the interval upon which it is based is very short, retest reliability should be weighted much lower than estimates of consistency.

Both Spearman-Brown and Kuder-Richardson estimates for the four tests were within the range r = .84-.95, and as such provide acceptable estimates of reliability. The split-half estimate of 0.84 for the PMA is not based upon a total score, but is the average of the reliability estimates for its subscales (Cronbach, 1960). The r = .90 cited for the CTBS is in fact a reliability estimate borrowed from the Iowa (Cronbach, 1970).

Although all four tests have acceptable estimates of reliability reported for them, the Metropolitan appears to yield the most consistent estimate regardless of method of computation. More importantly the split-half estimates cited in the manual (0.91, 0.91, 0.94) were obtained from a three group cross-validation (Hildreth, Griffiths and McGauvran, 1965). No other test reviewed in this paper has this support cited for it. An additional feature of the Metropolitan is that it has been the subject of substantially more definitive research than any of the other tests. Finally, having been revised in 1965, the Metropolitan has the most contemporary format and content of the available tests.

Validity: To possess utility, a test should first be shown to possess content or construct validity (Helmstadter, 1964; Cronbach, 1970). These types of validity demonstrate most completely the extent to which the test score represents what it appears to, or is purported to represent. Although criterion-related estimates may indicate concurrent and predictive utility there is always the possibility that the estimates are actuarially-based rather than content based. Thus content or construct validation should be demonstrated as an anchor for criterion-related validity. The most sophisticated method of determining content and construct validity is through factor analysis. When tests, such as the type under discussion, are purported to provide measures of a number of abilities, numerical, spatial and verbal, for example, then it would seem contingent upon users to demonstrate that these scales are relatively pure factors. Similarly, assumptions that the test is sampling a construct like maturity or intelligence requires demonstration that this is indeed the case. Seldom are these requirements realized.

In his review of the PMA, Milholland (in Buros, 1965, p. 1048-1050) reports that although a promising instrument, it simply lacks the necessary validity studies. Cronbach (1960) is adamant about the validity of the PMA in his statement, "Incautious and incorrect claims have been made for the PMA tests" (p. 292). In 1970 he reiterated, "there is little validity research to support profile interpretations" (Cronbach, 1970, p. 376). Although claiming content validity for the Metropolitan, Hildreth et al. (1965) cite as support for this assumption moderate intercorrelation between the

subscales: this certainly supports their claim of a composite readiness measure, but does little to provide evidence of content validity.

The two tests for which content or construct validity studies were found are the Iowa and the Detroit. Finley (1963) found, from a survey of 36 California grades 3 and 5 teachers, that, when compared with other achievement tests the Iowa (CTBS) was preferred for its superior content. Although not a quantified estimate of validity the finding does demonstrate an important facet of content validity, namely user preference. Only one factor analytic study of construct validity was found and is based upon an Alberta sample of 300 boys. MacArthur (1960) reports an analysis which included the CTMM, Progressive Matrices, achievement tests, and the Detroit. The analysis yielded four meaningful factors: (I) intelligence, (II) schooling, (III) verbal, and (IV) numerical. The Detroit was found to load highly on factor I and moderately on factors III and IV. The Detroit would appear to sample the construct "Intelligence" as well as necessary academic abilities.

In contrast to the few studies on instrument validity, the research on criterion-related validity is plentiful, which may have been expected when the tests in question are purported to measure maturity or readiness to handle school work successfully. Consequently, estimates of concurrent and predictive utility are critical validity criteria. In general, the relationship between these tests and school grades, and teacher ratings of performance was moderate. Milholland (in Buros, 1965, p. 1048-1050) reports the median correlation between PMA subscale and school grades to be $r = .59$. Merenda and Jackson (1968) found Iowa subtest correlations with the final grades of 1,078 fourth graders to range from 0.21 to 0.70 ($r = .37$). Although these coefficients are significant, they offer only moderate support for the concurrent validity of the Iowa. In a more definitive study, Finley (1966) had teachers rate their third and fifth grade pupils as below, at, or above the grade level in performance. Using the Iowa to classify pupils at the three levels he found that teacher ratings matched the Iowa classification about three-quarters of the time. In an earlier study, Finley (1963) found concurrent coefficients between the Iowa and other achievement tests to range from 0.65 to 0.87. The Iowa has been the most thoroughly researched instrument in this respect and generally is found to function quite adequately.

The only strict studies of predictive validity found were for the Metropolitan and Detroit. Using teacher ratings and final grades as the criteria the Metropolitan has been shown consistently to predict grade 1 performance. Administered in April, prior to first registration, the Metropolitan was found to correlate 0.56 (Mattick, 1963) and 0.53 (Zingle and Hohol, 1964) with first grade performance. The latter study like the following, was based upon an Alberta sample. Romaniuk, (1964) studied the utility of the Metropolitan in the prediction of first grade readiness for underaged children in Jasper Place. He found that the test misclassified children as either false positive or false negative in a mere 13.5 percent of the cases as compared to 19 percent by chance. While an important demonstration of the utility of the test, it is this very kind of research which desperately needs the conclusive support of cross-validation.

As is too often the case in estimating predictive validity, the criterion variable is test-measured achievement rather than the eventual criterion, teacher assigned grades or promotion statements. Flathman (1966) reported Detroit prediction coefficients of 0.48 for reading skills and 0.59 for arithmetic, based upon Alberta grade 1 pupils. Hamaluk (1967) found a correlation of 0.65 between the Detroit and the Gates Primary Reading test with the same population. In a study that may reflect upon the use of these tests with Alberta's native population, Mishra and Hart (1970) found a fall-to-spring predictive correlation range of 0.49 to 0.53 between the Metropolitan and the related Metropolitan Achievement Tests with third grade Mexican-American children. This range is substantially lower than that reported by Hildreth et al. (1965) in the Metropolitan's manual. Although the subject of much research in relation to intelligence tests, little is known about cultural effects on mental maturity scales.

Conclusions: In all respects the Metropolitan has been the best researched of the four tests. Estimates of reliability and validity for the test are consistent and tend to be somewhat higher than those cited for the other tests. A shortcoming of each test is its relatively low validity estimates, a finding that should be of some concern to educators. Each of the tests was designed to sample characteristics presumed to contribute to success in school work. While they appear to sample these characteristics other variables appear to be of equal, if not greater importance. For example, Chronister (1964) found that, in a multiple-correlation of seventeen personality, behavioral and intelligence variables with the Iowa, intelligence alone accounted for 90 percent of the variance. The relationship is so high that "intelligence" and "mental maturity" or "readiness" could very well be interchangeable constructs. As with intelligence tests, one must wonder whether the concept of "mental maturity" is not a too molar concept which is over-encompassing. As an alternative, educators might consider more emphasis on maturity or readiness for specific skills like reading or arithmetic. In any event, if these tests are to have utility it should not be as classification devices. Rather, they would be best used as academic monitors to point out possible pupil weaknesses to the teacher.

Discussion

In general, the tests reported in most frequent use are the tests which were found to be among the better substantiated by reliability and validity studies. Fortunately those tests which are the least appropriate for use with children, or are not supported for use by the literature, are not in general use. However, a few of the more frequently used tests are not well researched and thus should be used with extreme caution. Although users appear to have selected their tests well, one can only speculate on the uses to which the tests are put. On the other hand, users must be disappointed by the generally low quality of research they may consult when evaluating a potential test. Too often the studies reported have been conducted with inordinately small numbers, or with samples of unrepresentative children. A user must wonder how studies of these types relate to the population with which he intends using the test. Too few good reliability or validity studies are reported in the literature. Instead, there

is a proliferation of studies which ask questions which are peripheral to a user's major considerations. It is as if the researchers are accepting the claims of reliability and validity made for the instrument without considering the special characteristics of their samples. Consequently, the tests are being employed in exquisite designs and yielding marvelous results even though prior demonstration of fundamental utility is not well established. A potential user who followed A.P.A. standards in selecting tests would find, as did this review, that claims are apparently made tongue-in-cheek, on the basis of clearly ambiguous results or on the basis of no data at all!

A finding with many tests was that reliability and validity estimates were a function of age, generally increasing with age. The implications of such findings demand the utmost caution and consideration when test results may have a pervasive influence on subsequent education. Although it is unlikely that drastic decisions would be made on the basis of the results of *one* test, there is always the possibility that a combination of errors will accumulate, leading to the victimization of a child.

Recognizing that so many variables can attenuate reliability and validity, it is surprising that so few cross-validation studies are performed. Although replication of studies would provide comparable findings, replications are generally not being made, and in the few instances where they were found, the differences in methodology were more than enough to discourage confidence in the results. Cross-validation procedure can produce what replication cannot, namely a standardized method and thus results comparable in the strictest statistical sense.

Psychological tests are recognized as attempts to sample the actual domain of an individual's beliefs, behaviors, skills, abilities and so forth. As such, they are necessarily simply estimates of the way the individual is, they are not exact replicas. Given that this is so, then it would seem only reasonable that every attempt be made to investigate the relationship between these representative estimates and reality. It was disappointing therefore, to find that so many concurrent and predictive validity studies use as criteria, not the realities of the testee's life, but other representative estimates of reality. It may be reassuring to know that two tests of ability are related, but at some point these two tests must be shown to be related to a non-standardized reality. Perhaps no other circumstance can provide such a rich collection of behaviors, skills, achievements or abilities than the classroom education of the individual. It is high time that these tests were shown to relate to the actual processes of education rather than to other best estimates.

The avialability of tests places the educator in a dilemma. He wants objective, unbiased knowledge of his pupils' abilities and so forth, and so he either turns to available tests or constructs his own. But what happens when the test fails to agree with what he observes? Does he reject his impressions as being subjective and biased, or does he reject the tests' results as being inaccurate and invalid? Unfortunately, the dilemma is unsolvable unless you happen to be that educator. As long as tests are used in education systems, the dilemma will occur repeatedly. One can only hope that it continues to recur, for if it does not, either the tests are super-

flous, or else the teacher is being guided by blind faith. If it does, then let everyone hope for the child's sake that the teacher knows his tests.

The review was conducted while the author was a Canada Council Doctoral Fellow in the Department of Psychology, The University of Calgary.

N.B. For details of tests not referenced, the reader should consult Buros.

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The Alberta Journal of Educational Research *Vol. XIX, No. 4, December, 1973*

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Psychological Orientation of Soviet Teachers

Teachers in the USSR, just as in North America, take courses in psychology, read psychological articles, hear lectures on psychology at their professional meetings, and participate in psychological discussions concerning pupil behavior and the process of teaching. But the theoretical orientation of the psychology they learn, in contrast to that studied by North American teachers, is not within the traditon of James, Thorndike, Koehler, Watson, Freud, or Piaget. Some of the leading names in their psychology are Vygotsky, Pavlov, Makarenko, Uznadze, Luria, Zaporozhets, and Kostiuk. These scholars, some of whom are widely known in the west, are rarely referred to in popular North American texts on educational psychology. The teachers of the USSR have a distinctive, and probably unique, tradition in psychology and their attitudes to educational issues and practices reflect the orientation of this tradition. Some of these orientations are identified and discussed in this paper. (Dr. Gulutsan is Associate Professor in the Department of Educational Psychology, The University of Alberta.)

The psychological background of the Soviet teacher's orientation which contrasts most with that found in the West can be summarized as follows:

1. The influence of Vygotsky and his students, especially Galperin and Luria, on the conceptions of learning, mental development, and the formation of mental actions;
2. The physiological basis of mental activity, regarded as "reflection"; and
3. The role of the collective in socialization and character development.

The reader is forewarned that similarities exist between the orientation of teachers in both East and West: it should not be concluded that Soviet teachers represent a unique species of man. But it must also be said that Western viewpoints on Soviet psychology and its bearing on education, can be grossly misinformed. One illustration of this is the statement by Stout (1967, 27-8):

> Philosophically, the Soviets are bound to certain axiological and epistemological biases, which in essence reflect the belief that certain individuals are possessed of intellect which is educable and others with certain abilities and capacities

> which are trainable. The influence of Pavlovian psychology with its stimulus-response emphasis is in clear evidence throughout the operation of the system, which is directed toward the notion that man is nothing more than a highly trained animal whose behavior can be largely determined. It appears that the answer to the question of whether or not man is the sum total of all his parts or something else is still to be determined by the Soviets.

On the other hand the words of Makarenko have a familiar ring, "Obviously we need talented and sensitive people (as teachers) with desirable character attributes. To select the outstanding ones remains a difficult task, although many people still believe that anyone can bring up children" (Makarenko, 1964, 159). Other common features can be readily found.

Vygotsky on the Relation of Learning to Development

Vygotsky's conviction that the essential mark of learning is that it precedes development and creates the zone of potential development (Simon and Simon, 1963, p. 30) has had a profound influence on Soviet education and psychology. Development depends on training. "Teaching", Vygotsky wrote, "which is oriented to an already accomplished stage of development is ineffective from the point of view of the child's general development, for it does not lead the process of development but lags behind this process. The only good teaching is that which outpaces (outdistances) development" (1963, p. 31).

Vygotsky rejects three views on the relation of learning to development which have deep roots and long traditions in Western psychology. First, he rejects the position he sees implied in Piaget's thinking. He says:

> The process of development is completely independent from the process of learning, that even a separation of these processes in time is postulated. Development must reach a certain stage, certain functions must mature, before the school can embark upon teaching certain knowledge and habits to the child. The course of development always precedes the course of learning. Learning lags behind development, development always goes before learning. This approach makes it impossible even to pose the problem of the role played in development by learning and by the maturing of those functions which are activised in the course of learning (1963, p. 22).

The critics of the conceptions that teaching should be postponed until the child is "ready" and that one should teach with an orientation towards the average had strong theoretical support from Vygotsky. Because of the translation lag, many Western authorities have not been aware of his contributions. They would have been heartened by an educational theory characterized by the absence of the postponement concept and of the notion of teaching to the average. Vygotsky's view that teaching must be actively directed at the learning which takes place in the zone of potential development would have given them aid and comfort.

The second view which Vygotsky finds unacceptable has a long tradition in North America and is associated with the functionalist positions of William James, Thorndike, and others. It is still very much alive in contemporary American educational theory. Here the focus is reversed and learning no longer follows development, learning *is* development. Vygotsky (1963, p. 22) writes as follows:

> At first glance this standpoint may seem more progressive than the preceding one, which is fundamentally based on complete separation of the processes of

> learning and development, in that it gives to learning the central significance in child development. But a closer examination . . . indicates that, for all the apparent contradictions, the two standpoints . . . learning is independent of development and learning is development agree on basic points and are, in fact, very similar to each other.

Vygotsky's interpretation of James' position and its relation to education reads as follows:

> Education, says James, may be best defined as the organization of acquired habits. Development is also in effect reduced to the accumulation of reactions. Every acquired reaction, says James, is usually either a more complex form of the innate reaction which a given object initially tended to evoke, or a substitute for it. James affirms this proposition as a general principle which underlies all processes of acquisition, i.e. development, and directs all the teacher's activity. For him the individual is simply a living complex of habits.
>
> It is difficult to clarify this concept except by saying that . . . laws of development [are regarded] as natural laws which teaching must take into account, just as technology must take into account the laws of physics; teaching can do no more to change these laws than technology can change anything in the general laws of nature.
>
> The theory sees the processes [of learning and maturation] as accomplished proportionally and in parallel so that each stage in learning corresponds to a stage in development. . . . The further question as to which process precedes, which follows after, is, of course, pointless (p. 23).

The third view, which Vygotsky finds unacceptable, comes from structural or Gestalt psychology. In Gestalt psychology the relation of learning to development remains unclear and contradictory because learning and development seem to be accepted both as coincidental and not coincidental. Development is taken as the result of both maturation and learning. Maturation makes learning possible; in turn, learning may stimulate or advance maturation. But learning necessarily plays a secondary role and is wholly dependent on maturation.

Vygotsky rejects, as has been seen, the view on learning and development advanced by Piaget, James, Thorndike, and the Gestaltists as inadequate for explaining learning in the child. Vygotsky formulated his basic law of development as follows:

> All higher (human) functions make their appearance in the course of child development twice; first, in collective activity, social activity, i.e. as interpsychic activity; second, in individual activity, as internal properties of the child's thinking, i.e. intrapsychic functions (1963, p. 26).

In brief, the development of the higher mental functions such as thinking, will and moral feelings arise from the child's interaction with the people around him. First, the social and external, then, the personal and internal, and finally, activity which is wholly dependent on the interiorized (learned) mental actions.

During the teaching act the teacher orients himself to the zone of potential development. This is the area which lies between the tasks the child can do with guidance and the tasks he can do independently. Vygotsky illustrates the concept by reference to the Binet-type tests. Because they rely on discovering what the child can do independently, such tests determine only the actual level of the child's development.

> We have before us two children with mental age of seven, but one [Vygotsky points out] with a little help can do tests up to nine years, the other only to

> seven and a half. Is the mental development of these two children equivalent? Their independent activity is equivalent, but from the point of view of future potentiality for development, the children differ radically (1963, p. 30).
>
> [Vygotsky concludes] the state of the child's mental development can, therefore, only be determined by finding out at least two levels—the level of actual development and the zone of potential development. This fact which of itself may seem of little significance, is in reality of decisive importance and brings into question all the theories about the relation between the processes of learning and development in the child. In particular, it alters the traditional view as to what should be the pedagogical approach when development has been diagnosed. Hitherto, the matter has been presented as follows: We try, with the help of tests, to determine the level of the child's mental development and this the educator must regard as the limit which the child cannot transcend. This very way of presenting the question involves the idea that teaching must be oriented to the yesterday of the child's development (1963, p. 30).

Vygotsky's basic notion that teaching must *outpace* rather than follow development was written in 1934, the year he died at age 38. It remains as one of the central pedagogical and psychological concepts taught to teachers and teachers-in-training in the Soviet Union (Krutetsky, 1971, p. 90).

Is it true to say that Vygotsky's influence has made a difference to the way the teacher works with the children in the classroom? My impressions, based on observations during visits to Soviet schools and on discussions with teachers, lead me to believe that there is a difference. The teachers attempt to direct their activities towards having each child become more perceptive of the world he lives in and more conscious of his relations to this world. They attempt to have each child develop modes of thinking which increase his ability to reflect reality. The goal appears to be the all-round development of each individual child. The teachers expect that their work will influence the development of the child's mind and, with this, his psychic life and personality. This atmosphere of individual concern within a setting of the organized collective, characterized the classrooms I visited, even though the physical arrangements were the kind that we in North America would consider traditional and inadequate.

Galperin on the Interiorisation of Actions

Galperin, a student of Vygotsky's, proposed a teaching model for interiorizing mental actions which Soviet psychologists and educators regard as efficient (Smirnov, 1966; Galperin, 1966). Mental actions, the psychic or internal analogues of objective actions, are formed by stages which strictly follow each other according to the following paradigm: (i) orienting basis of action; (ii) external action; (iii) action in external speech; (iv) performing action in external speech to oneself; (v) action in inner speech (thought); (vi) subsequent performing of action or exteriorization.

Two features are prominent in Galperin's paradigm. The external, i.e. the social, is primary and the inner intellectual and personality functions have their origins in that which is external to the child. Galperin says, man's entire mental make-up is set from outside, all its structures must be learned (1966, p. 55). The external becomes internal by a process of assimilation or appropriation. In this process speech plays the major role.

Galperin (1968) sought to apply his theory of stage-by-stage develop-

ment of mental actions to the teaching of arithmetic, writing, and grammar. For him, the ultimate stage is the *orienting basis* for arriving logically and rationally, rather than empirically, at the development of mental actions. For this type of higher level mental development, the child must acquire a generalized method of analysis which bears on the "basic units" of the material of the learning in question as well as the general rules of their combination in concrete phenomena. For arithmetic, this means that, in the initial stages, the child must be introduced to measurement (getting at the basic units) before learning to count (i.e. the rules of their combination).

Luria on the Role of Speech in the Regulation of Behavior

A study by Luria (1963) will serve to illustrate the Soviet theory of the role of speech in the development and regulation of behavior. The three functions of speech—generalizing, source of thought, and regulating behavior—develop as follows:

> At a very early age the child begins to master speech addressed to him; at first the general tone of this, then separate words and finally the content of complex combinations, the information which the adult addresses to him. At early stages of development information is perceived only in cases when the adult's speech is included in a situation witnessed by the child. If any child of up to a year old is addressed in an unusual tone, in any unusual situation, or if there are no concrete actions accompanying speech, then the content of speech remains beyond the child's understanding. Only in the third year does the child begin to perceive relatively complex sentence constructions.
>
> The child's ability to use the verbal instructions of adults develops in a similar way. By the end of the first year, the child is in a position to fulfil simple commands; but he only fulfils them if the command is given in a reasonable (and adequately feeling) tone and in a causal situation. A command given in an unusual tone, or addressed to the child in an unusual situation, is not fulfilled. If, for instance, a child who has just reached the age of two is asked to take a doll, at a moment when he is on his way to pick up another toy, he is unable to fulfil the adult's verbal instructions and, reaching out towards the doll, picks up the other toy on his way. If a child of this age who is putting rings on a stick is asked to take off a ring, the adult's verbal instructions, coming up against an already prepared action, are not sufficiently strong to overcome it, and the child, hearing this command, continues intensively to carry out the action begun.
>
> . . . Only considerably later, at the age of three to three and a half years, does perception of adult speech and performance of the tasks formulated verbally reach a stage of development at which speech in fact determines the child's further activity independently of the conditions in which it is addressed (1963, 85-86).

In tracing the development of a simple general rule such as pressing a button when the red light flashes and refraining from pressing when the green light flashes, Luria demonstrates the importance of speech in all stages of child development from the time when the child is first conditioned, with the help of speech, to press, then not to press, and then to press on red, and not to press on green. This conditioning takes several years. If the child is to generalize, to engage in thinking, and to regulate or control his own actions, he must do so with actions which have become internalized by means of speech.

School learning is based on the speech and thought patterns and actions which the child has acquired in his pre-school years. School learning,

through language, helps the child appropriate more and more of the world which surrounds him into his consciousness. This internalization is central for the formation of abilities because the child can do, create, express, or otherwise make external only that which is within him. Education moulds man's inner resources through speech. As a result, it is to be expected that Soviet teachers place much stress on speech in mental development.

In the schools, teachers at the secondary school level present a verbal description of the skill to be learned before placing tools and other working materials in the pupil's hands. Then the pupils are asked to verbalize and be as conscious as possible of the skill, for example, in terms of the sequence of manual actions. Learning is thought to be more effective when verbal analysis precedes the learning of a skill than where verbal analysis runs alongside the learning of the skill.

Physiologists on the Mind, Consciousness, Learning

The unifying concept in Soviet psychological theory is Lenin's theory of 'mental reflection'. Soviet teachers direct their activities so as to make individual children more conscious, more aware of the surroundings in which they live. In helping to develop the minds of children, the teachers believe that their prime task is in the area of the higher mental functions which lead to a more accurate reflection of reality by the individual pupil. Lenin (1970, p. 177) has said: "The mastery of nature manifested in human practice is a result of an objectively correct reflection within the human head of the phenomena and processes of nature, and is proof of the fact that this reflection (within the limits of what is revealed by practice) is objective, absolute, eternal truth."

The mechanisms which form the basis of reflective activity have been investigated by Soviet physiologists, to a lesser extent by psychologists. Their importance for psychology is illustrated in the following two quotations:

> The specific tasks of psychology begin in connection with the transition to the study of man's mental activity performed by the brain. Psychology studying mental activity is one of the sciences about man. It is the science which reveals the laws governing man's mental activity performed by the brain (Rubinstein, 1966, p. 51).
>
> For scientific psychology the point of departure for studying the nature and development of the mind is the proposition that the mental is a reflection and that it emerged in the process of development of the organic world as a property of highly organized matter (Shorokhova, 1966, p. 201).

The contributions of the physiologist, I. P. Pavlov, on conditioned reflexes, the second signal system (verbal behavior), and the orienting reactions are basic to the theory of mental reflection. The more recent Soviet research in this area is directed at complex patterns of behavior, and on such features as wholeness, goal-directedness, self-regulation, programming and prediction of actions (Smirnov, 1966, p. 20). Pavlov's view, man as a self-regulating system, has been summarized by McLeish (1963, pp. 185-190). These physiological findings form a chapter or two in the educational psychology texts used for training teachers and new developments are reported in regular educational journals (e.g. Liublinskaya, 1971; Kostiuk, 1968). Soviet teachers are introduced to the physiology of

mental activity early in their training. Parenthetically, the popular magazines, such as the *Home and School Journal* (Semya i Shkola), bring this knowledge to the attention of a wider public.

Teachers adapt their teaching procedures according to their understanding of the way the brain orients the organism to the environment. It is a matter of how the brain forms conditioned reactions, including speech and thinking, and stores and uses these for an adequate reflection of reality.

Makarenko on the Collective in Personality Formation

Soviet approaches to character education owe much to the thought of Anton Semyonovich Makarenko. Scarcely a week passes without some mention of Makarenko in the educational press of Soviet Union. Translations of, and commentaries on, Makarenko's work continue to indicate his popularity. Schools bear his name. Merit teachers wear the Makarenko medal.

For Makarenko (1949, 1953, 1959), education is by the collective, through the collective and for the collective. This is so because the collective is the basic unit of organization in Soviet society. Makarenko's basic thesis has been summarized by Bronfenbrenner:

> Optimal personality development can occur only through productive activity in a social collective. The first collective is the family, but this must be supplemented early in life by other collectives specially organized in schools, neighborhoods, and other community settings. The primary function of the collective is to develop socialist morality. This aim is accomplished through an explicit regimen of activity mediated by group criticism, self-criticism, and group-oriented punishments and rewards.

Bronfenbrenner (1962, p. 555) is probably the most prominent American authority on the collective in socialization. He identifies the seven principles of communist methods of character education which present the greatest contrast to patterns employed in the West:

1. The peer collective (under adult leadership) rivals and early surpasses the family as the principal agent of socialization.
2. Competition between groups is utilized as the principal mechanism for motivating achievement.
3. The behavior of the individual is evaluated primarily in terms of its relevance to the goals and achievements of the collective.
4. Rewards and punishments are frequently given on a group basis; that is to say, the entire group benefits or suffers as a consequence of the conduct of individual members.
5. As soon as possible, the tasks of evaluating the behavior of individuals and of dispensing rewards and sanctions is delegated to the members of the collective.
6. The principal methods of social control are public recognition and public criticism, with explicit training and practice being given in these activities. Specifically, each member of the collective is encouraged to observe deviant behavior by his fellows and is given opportunity to report his observations to the group. Reporting on one's peers is esteemed and rewarded as a civic duty.
7. Group criticism becomes the vehicle for training in self-criticism. It is regarded as a powerful mechanism for maintaining and enhancing commitment to approved standards of behavior, as well as the method of choice for bringing deviants back into line.

Helen Redl (1964, p. 142) has summarized the Soviet system of upbringing created by Makarenko in these six important characteristics:

1. *Demands*—He advocated a combination of most exacting demands upon the youngster with utmost respect for his individuality.
2. *Discipline*—He proposed that children require the discipline of combating and surmounting difficulties.
3. *Character Building*—Makarenko felt that the first two elements plan an important role in the character building process.
4. *Family Role in Upbringing*—He stressed the importance of correct family upbringing and gave many instructions to parents (lectures on child education).
5. *Collective*—He was the first one to elaborate in detail the educational significance of the collective.
6. *Perspectives*—Makarenko said, "Man must have something joyful ahead of him to live for . . . this joy has to be organized, brought to life, and converted into a possibility. Primitive sources of satisfaction must be steadily converted into more complex and humanly significant joys. . . ."

Bronfenbrenner (1966) carried out an interesting cross-cultural experiment in which he compared the responses of Soviet and American school children to pressures from adults. He reasoned that Soviet school children, because of the role played by the peer collective in Soviet methods of upbringing, would be less likely than their American age-mates to experience peer pressure as conflicting with adult values. Hence, they could identify more strongly with adult standards of behavior and be more responsive to adult influences. He asked school children in both countries to respond to a series of conflict situations under three experimental conditions: a neutral condition in which the child's reaction would be known only to himself and the experimenter, an adult condition in which responses would be revealed to parents and teachers, and a peer condition in which everyone's answers would be shown to the entire class but not to adults. The principal results of the experiment were as follows: American youngsters revealed a much greater readiness to engage in peer-instigated antisocial behavior than did their Soviet counterparts. Although children from both countries showed equal reaction to pressure in claiming more socially approved behavior under the adult condition than under the peer condition, Soviet youngsters were more responsive to adults, whereas the Americans were more influenced by their peers. Moreover peer pressure operated in opposite directions in the two societies, increasing adult-approval responses in the USSR and antisocial reactions in the United States. With respect to problems of education, Bronfenbrenner points out, the findings emphasize the importance of utilizing the power of the peer group to constructive ends to influence the behavior and personality development of the child.

Educational Psychology Texts

A main source of data on the psychological orientation of teachers are the texts designed for introductory courses in educational psychology. The table provides an analysis of the contents of three texts in educational psychology from the USSR, the USA and Britain. The following observations may be of interest in that they point to features emphasized in Soviet texts.

TABLE 1

APPROXIMATE COVERAGE OF SELECTED TOPICS IN A RUSSIAN, A BRITISH AND AN AMERICAN INTRODUCTORY TEXT IN EDUCATIONAL PSYCHOLOGY

	Russian (Levitov) 297 1/4 Pages %	American (MacDonald) 620 3/4 Pages %	British (Stone) 367 1/2 Pages %
Educational Psychology (General)	8.5	14.5	14.5
History	3.7	0.1	-
Statistics, Design, Methodology	0.3	1.9	0.8
Developmental	3.8	4.9	4.9
Neural and Physiological Correlates of Behavior	3.0	-	3.5
Heredity and Environment	-	0.8	5.6
Abilities, Aptitudes, Retardation, Intelligence	-	2.9	11.9
Typology and Individual Differences	4.8	1.5	0.4
Attitudes and Social Psychology	7.4	18.1	6.0
Motivation and Emotion	2.5	3.1	8.3
Volition and Moral Behavior	6.2	-	-
Personality and Interests	10.0	3.6	-
Attention and Set	2.5	1.3	1.2
Concept Formation and Thinking, Problem Solving	5.1	6.4	13.2
Conditioning and Learning	7.1	16.8	16.4
Creativity and Aesthetics	10.5	1.3	-
Habits and Skills	7.7	2.3	0.5
Memory	1.8	2.2	-
Perception and Sensation	3.4	2.1	1.6
Simulation and Modelling	-	2.9	-
Verbal Behavior	1.7	0.4	4.6
Vocational Development	3.3	-	-
Evaluation	-	10.0	6.0
Teacher's Role	6.7	2.9	0.7
	100.0	100.0	100.0

The Russian text gives considerable attention to personality, interests, aesthetics, volition, moral behavior, individual differences, and the role of the teacher. Matters relating to intelligence, evaluation, and statistics receive little or no coverage as is true of the heredity-environment issue. The American and British texts devote more space to learning and conditioning, the area considerably influenced by Pavlov's physiological studies of the higher nervous functions. Social psychology receives more attention in the British text.

Concluding Remarks

Only a small segment of Soviet educational psychological thinking has been selected to give some perspective, or feeling, for the psychological orientation of Soviet teachers. The literature on personality formation, moral development, individual differences, temperament, defectology, the psychology of school subjects has not been touched upon. But the trends described above are characteristic of these other areas.

Soviet writers regard their theories and methods as more progressive and more optimistic in relation to the role of the school than those found in bourgeois or capitalist countries. The theories of educational psychologists reveal extensive possibilities for training children and improving education. The real masters of pedogogics according to Kuzmina (1963) know that everything serves the main purpose, the formation of personality. For this, psychological science provides the rationale (p. 101).

> Among the teaching abilities that teachers are expected to develop, we find one called *pedagogical imagination.* Kuzmina describes this as "the ability to imagine the ideal personality, the model after which the teacher wishes to shape his pupil by means of developing his natural tendencies and capacities, moulding his personality, his habits, his behavior, his future activity, his happiness; in fact, raising him to the level of a highly developed personality, with a wide range of interests. At every stage of his educational activity the teacher achieves but partial results. His imagination helps him to continue to keep in mind the final purpose. It helps to see the future nature of his pupils, to foresee the development of individual pupils and groups of children, and to arrange his educational work in such a way as to promote the positive features of a personality and to inhibit the children's negative tendencies, thus planning for the most remote future of the children. It is imagination that helps the teacher to see the teaching matter as well as his educational measures from the children's point of view and thus he is able to improve the educational process accordingly (1963, p. 96).

One may observe, in conclusion, that the psychological orientation of teachers is consciously fostered in the USSR. A coherent psychological rationale, along lines which are optimistic, broad, stimulating and coherent with dialectical materialism, supports this orientation.

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The Alberta Journal of Educational Research *Vol. XIX, No. 4, December, 1973*

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An Analysis of the Applicability of the Locus of Control Construct

The usefulness of Rotter's "locus of control" construct in suggesting hypotheses was called in question in a previous study by Janzen, Beeken, and Hritzuk. This paper clarifies the problems raised in the earlier paper, and analyzes certain other generalizations that have been made about this variable. The positive evaluation of the concept of internality is questioned. The I-E scale, used to measure locus of control, is examined. A potentially productive area of research and application—learning theory—is pointed out. (Dr. H. L. Janzen is Assistant Professor in the Department of Educational Psychology, The University of Alberta; Don Beeken is a graduate student in the same department).

In a previous study by Janzen, Beeken and Hritzuk (The Alberta Journal of Educational Research—March, 1973) various dimensions of teacher attitude were examined in relation to the Internal-External Locus of Control scale developed by Julian B. Rotter (1966). The I-E scale, as it is termed, is an attempt to measure the extent to which a person believes that reinforcements are contingent upon his own behavior (such a belief is termed "internal" locus of control), as opposed to a belief that reinforcements are the results of luck, or chance, or powerful outside forces, or unpredictable events ("external" locus of control). Janzen *et al.* (1973) were concerned with the relationship of this personality variable to teacher attitudes such as classroom order, integrative learning, consideration of student viewpoint, subject matter emphasis, emotional disengagement, and student autonomy.

The purpose of this paper is to examine the value of the locus of control construct as a predictor of attitudes such as those mentioned above, and in general, as a useful predictor of other personality variables. In particular, this article will examine the role of locus of control in interpersonal

relations, and of activity (social or otherwise) as opposed to complacency. These two concerns arose out of the results of our previous study. We will also discuss certain problems which seem to be persistent in the expectancies of an internal or external control ideology, and we will offer a suggestion as to why such problems have arisen. It is hoped that such a discussion will provide useful insight into the generation of further hypotheses and especially into the explanation of subsequent results.

One important hypothesis of Janzen *et al.* (1973) regarded the relationship of locus of control to the degree to which a teacher endorsed student autonomy. It was expected that greater belief in student autonomy would correlate with an "internal" locus of control. This expectation resulted from a characterization of the "internal" individual as one who is more skill-oriented and capable, who holds himself responsible, and who tends to see others in the same light in which he sees himself (Rotter, 1966). The same expectation is reinforced by further characterizations of the internal as less dogmatic (Clouser & Hjelle, 1970), less neurotic (Platt, Pomeranz, Eisenman, 1970), less anxious (Hountras & Scharf, 1970), less blaming (Phares, Wilson & Klyver, 1971), more likely to attribute success to ability than to motivation (Bartel, 1970), and more tolerant (Hersh & Schiebe, 1967). Central to this hypothesis was the suggestion that the "internal" would be more likely to give to others the freedom of individual action that he perceives himself as enjoying. He should see others as also "internal" and this perception should be accompanied by a desire to treat them in the same manner in which he himself expects to be treated. Since the "internal" is resistant to coercion (Lewis & Blanchard, 1971) he is expected to be less coercive of others, that is, less controlling. In the case of the teacher-student relationship he should therefore allow greater student autonomy.

The hypothesis that the "internal" will endorse student autonomy was rejected. In fact, the correlation was in a direction exactly opposite to that expected. The "external" teacher endorsed student autonomy, the "internal" did not ($r = 0.30$; $p = 0.05$). The explanation of this result leads to reconsideration of the proposition that the "internal" is actually more willing and capable than the external of seeing others as he sees himself or of granting them autonomy. There seem to be some impediments to his taking this perspective.

We cannot overlook the "controlling" qualities possessed by the "internal". He believes that self-originated activity is useful and possible and he is likely to exert attempts to control his environment. He is self-controlling and concerned with failure (Rotter, 1966). He is resistant to coercion (Lewis & Blanchard, 1971) and he is dominant. He sees himself as assertive, achieving, independent, and powerful (Hersch & Schiebe, 1967). These characteristics would seem to promote an outlook upon others as being part of an environment in which the internal sees himself as responsible and powerful. Why should we expect his controlling attitude to reverse itself in the special case of inter-personal relations? The movement toward seeing others as autonomous is in no way encouraged by the controlling tendencies mentioned above.

It seems logical that the qualities commonly associated with the

"external" would be much more likely to promote the autonomy of others. He is less worried over matters of personal control, failure, and coercion. These characteristics would permit a less power-oriented perspective which would be manifested in a less controlling outlook towards other persons—such as students. The results of our previous study would seem to support this view.

It has been suggested that the external outlook forms a type of defense mechanism against failure (Rotter, 1966; Rotter, 1971). Ostensibly the external can refuse to take failure personally and thereby avoid its trauma. Whether or not this is true, it should be noted that this type of defense is quite different from "defense by control" as exhibited by the internal.

That "internals" may in fact be more defensive is supported by Lipp, Kolstoe, James & Randall (1968) who found that "internals" who were physically disabled had significantly higher recognition thresholds than their "external" counterparts when presented with pictures of handicapped persons. They seemed to be more denying of their own situation. This distortion of objective reality was also demonstrated by Lewis and Blanchard (1971) who found that "externals" more correctly perceived their quality of choice in an experimental situation than did "internals". This tendency toward defensiveness seems to be part of a general propensity for the "internal" to strive strongly to retain control regardless of his situation. Such a defensive reaction might not always be appropriate, and on the part of an "internal" teacher, would count against his ability or willingness to encourage student autonomy at the expense of his own control.

The correlation (in the teacher sample) of external locus of control with endorsement of student autonomy can be explained in the manner just stated. But it seems that an opposing explanation of the same correlation must be anticipated and dealt with. The opposing argument is typical, and runs something like this: the "external" teacher is pessimistic about personal power, and fearful of responsibility. He is apathetic to life, action, other people in general, and his class in particular. From this outlook, students gain autonomy. In the opinion of the present authors, such a view is intolerable. Our reasons for rejecting it follow.

It is unfortunately common in research concerning locus of control, that implicit assumptions of the negative nature of externality and the positive nature of internality, contribute a great deal to generation of the hypotheses and explanation of results. One of the most seriously damaging of these implicit assumptions concerns a predilection to activity of the "internal" as opposed to passive, apathetic tendencies of the "external". Very little research supports this conjecture.

A study by Seaman & Evans (1962) of tuberculosis patients found that "internals" asked more about their condition and were less satisfied with the answers than "externals". Seaman (1963) also found that reformatory inmates remembered more about operation of the facility, parole, and long range economic facts related to their eventual freedom, if they were internal than if they were external.

Strickland (1965), Phares (1965), and Gore *et al.* (1963) found some evidence that social action is correlated with internality.

On the other hand, Rotter (1966) failed in two cases to predict petition-signing from locus of control. Thomas (1970) while attempting to find a bias in the I-E scale, managed to demonstrate that "internals" were more conservative than "externals". Minton (1970) in his male sample, failed to find any correlation between locus of control and liberalism/conservatism, left/right ideology, or attitudes in the area of international relations. Slight correlations were found in the female sample. A similar lack of correlation between political participation and locus of control was found by Evans and Alexander (1970). Hjelle & Clouser (1970), found little evidence to support the suggestion that internals would be less likely to smoke than internals. (Non-smoking was expected to relate to *active* concern for matters of health.) Goss and Morosko (1970) found that alcoholics (assumedly a "passive, apathetic" syndrome) were *internal.* Phares, Ritchie and Davies (1968), stating that "internals" were more willing to remedy "personality problems", may have found some support for the internal-active hypothesis, or they may have found evidence that internals are more conforming than are externals. A study by Ducette and Wolk (1972) noted significant differences in the level of aspiration of lower-class black high school students. Those who were *external* were more aspiring than the internals. Hersch, Kulik, and Schiebe (1969) found, in a study which contradicted their own previous results, that locus of control did *not* differentiate volunteers and non-volunteers for work in a mental hospital. Gurin, Gurin, Lao, and Beattie (1969) concluded that the prediction of social activity in their Negro sample could *not* be made on the basis of an undifferentiated I-E scale, but that certain orthogonal factors which they identified *within* an expanded scale could be used as more reliable predictors.

Results such as these must shed doubt on research which has used words such as "alienated", "powerless", "apathetic", "passive", "complacent", with reference to persons with an external locus of control. Rotter himself has said, "Clearly we need continuing study to reverse this trend [toward externality]. Our society has so many critical problems that it desperately needs as many active, participating internal-minded members as possible. If feelings of external control, alienation, and powerlessness continue to grow, we may be heading for a society of dropouts—each person sitting back, watching the world go by" (Rotter, 1971). Such an outlook does little to encourage consideration of the possibility that external locus of control may have its good points.

And it certainly *is* possible to contend that an external locus of control has positive aspects. These would include a more liberating attitude to interpersonal (and other) relationships, greater tolerance of chaotic and unpredictable situations, a more realistic appraisal of the nature of what influences us, and a less overt desire for power. Whether or not subsequent research investigates these possibilities, the present point is that such a positive approach to external locus of control has not been assumed with anywhere near the frequency that it has been assumed for internality. We feel that this is largely due to the nature of the terms used, which bias our thinking badly in favor of the "internal" personality.

The I-E Scale

Support for taking a new look at the locus of control construct comes from several sources. Coan (cf. Dies, 1968) found that the I-E scale favors items which deal with social and political events rather than items dealing with personal qualities or interpersonal concerns. Mirels (1970) isolated factors relating to (1) personal control, and (2) control over larger interests. Gurin, Gurin, Lao, and Beattie (1969) factor analyzed an extended I-E scale and found several orthogonal factors. Within the 23 items of Rotter's scale itself, they identified two distinct measures:

1. Control ideology: a measure of the subject's "world-view" or general belief in the mechanisms of control. Items of control ideology are, explicitly or implicitly, third person.
2. Personal control ideology: a measure of the subject's assessment of his individual control of personal events. These items are phrased or interpreted as first person.

Prediction of social activity, they found, *could* be made on the basis of these sub-scales *plus* a measure they termed "Individual-System Blame Attribution". But when the measures of control ideology and personal control were undifferentiated, such predictions could not be made.

The implication of these studies is that the locus of control scale may not be measuring exactly what it purports to measure. For example, here are the responses to item 18: (a) (external)—"Most people don't realize the extent to which their lives are controlled by accidental happenings", and (b) (internal)—"There is really no such thing as 'luck' " (Rotter, 1966). We are tempted to reject "a" on the ground that even though we may realize accidental happenings can have important effects, we are by no means willing to concede that they "control" us in any sense. But "b" may be even less palatable since "luck" plainly does exist and we are asked to deny that this is true. This problem may be typical of most forced choice items, but the analysis by Gurin *et al.* helps us to recognize a further problem.

If we orient ourselves in terms of control ideology (a "world-view") then philosophical determinism might propel us to answer "b", while a philosophy of "hazard" dictates "a". We might be very tempted to answer "a" if we are black, or Jewish, or short, or beautiful, or identify some accident of our situation as being extremely important to success. We would answer "b" if we strongly believed that none of these "accidents" were at all important. On the dimension of personal control ideology we might choose "a" if our personal history of success/failure included important results of "accidents" and "b" if such a history showed the results of luck to be minimal compared to the effects of our wilful choices and actions. The important point here is that any individual could give a different response to the question on different dimensions. Which of these is the I-E scale actually measuring? The argument is that it is the *personal control* dimension, but some items are open to the alternate interpretation, and some items plainly contradict this. Item 12 is one example: 12 (a) (internal)—"The average citizen can have an influence in government decisions."; (b) (external)—"This world is run by the few people in power and there is not much the little guy can do about it." This

item is quite obviously a measure of an attitude towards a socio-political problem (control ideology) rather than a measure of personal control. The assumption is that the respondent will replace "the average citizen" with "I", but a legitimate response can be made to the literal question. This response might be "a", in favor of a "citizens' " control, even though the subject does not care about exercising his personal vote or voice.

A final characteristic of the scale (and of the basic hypothesis) merits consideration. The purpose of the scale is to differentiate individuals along a dimension whose *extremes* are a belief in total personal control and belief in the total lack of personal control. Between these extremes stretches the continuum of locus of control. (Users of the scale recognize that extreme responses are unlikely and that most subjects score in an intermediate range.) It is assumed that the continuum will, as we approach the external extreme, show an increasing concern with matters which are progressively further beyond personal control. This assumption however, is *not* legitimate, given the structure of the scale. We are asked to orient ourselves between "within my personal control" (internal) and "due to luck, etc." (external). There is no place on this continuum for a response such as, "to some extent I am controlled by [a particular] legitimate social-physical force". The nature of this dichotomy ignores measurement of the degree to which subjects endorse other kinds of control or influence which do not even involve luck, fate, control by powerful others, or accident—such items as heredity, the mood of a wife, highway conditions, normal social and group pressures, and economic facts. We can respond that our personal control is powerful (compared to luck), or weak (compared to luck), but we cannot respond with an indication of what other, commoner and less extreme sorts of external control we feel are most important and influential.

The internal or external is therefore characterized by his attitude to luck, fate, control by powerful others, or accident, rather than by his attitude to the controls exerted by a real social and physical setting. The second measure, related to certain plausible events, is what we *need* to generate viable behavioral hypotheses—the first, relating our attitude to "overwhelming" controls only, is what Rotter makes available.

Applying this to our discussion of the "apathetic" external (or external teacher), we realize that the stated purpose and the construction of the I-E scale encourages the passive view by characterizing the external along the narrow dimension of belief in luck, fate, etc. The subject's orientation to real and common types of actual controlling forces, in a real physical-social world, is not surveyed; but it is a measure such as this which would more legitimately enable us to predict initiative, drive and ambition.

Research workers who are interested in locus of control will need to construct a scale in which the items range over a continuum of controlling forces (slight to extreme), where the subjects are asked to respond with a scaled measure of the extent to which they feel influenced by each item. Luck, fate, powerful others, and unpredictable events would then be subsets within a scale which could also include more realistic physical-social controls.

In summary, we feel that the implicit assumption that an internal locus of control represents a more positive approach to life should be abandoned until further investigation confirms this expectation. The references cited earlier provide some evidence for characterizing the internal as less open, less realistic, more controlling, less tolerant of chaotic situations, more defensive, more self-centered, and more restricting in interpersonal relationships. The notion that internals will be less coercive of others should be re-evaluated.

The relationship of locus of control to a tendency towards action, or complacency, is not a simple one, and the implicit assumption that the "external" should be more passive is not supported. The abandonment of such pre-conceptions as this will free thinking regarding locus of control, and enable less biased hypotheses and explanations to be generated.

In his monograph (1966) Rotter hypothesizes: "that this variable [locus of control] is of major significance in understanding the nature of learning processes in different kinds of learning situations". Effort should be made to apply the theoretical constructs of locus of control to the area Rotter indicates above—learning theory. The idea that a learner learns *better* if a reward or reinforcement is perceived as contingent on his own behavior rather than on luck, etc., is significant to teachers, creators of learning materials and methods, and curriculum developers. We can envision applications to guided discovery teaching methods, to student-directed learning, to lecture methods, graded and non-graded courses, mastery learning, behavior modification, and other concerns of educational theory and practice.

Such new applications of the locus of control construct would be far more useful to educators than the present applications have been to personality theorists.

This study was supported by The University of Alberta's Research Grants and Contract Office under Project 55-32481.

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The Alberta Journal of Educational Research *Vol. XIX, No. 4, December, 1973*

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SACU Test Variables as Predictors of University GPA

The relative effectiveness of the School and College Ability Test, two SACU tests of ability, averages of Grade XII Departmental Examination scores, and averages of scores submitted by high schools in predicting university success was examined as it applies to Alberta. The study was based on a sample of Alberta students who wrote the SACU battery in 1969 and subsequently enrolled at The University of Alberta. The two sets of Grade XII averages were found to be the best predictors, and about equal in effectiveness. A difference between the means of over ten points was noted. The CELAT was found to be the best predictor among the standardized ability tests. Implications were drawn, focussing on the decision by the Alberta Department of Education to cease requiring students to write Departmental Examinations. (Dr. Nyberg is Associate Professor in the Department of Educational Psychology, The University of Alberta. Mr. Baril is a graduate student in the same department).

Background

A great deal of research effort has been devoted to the problem of predicting success at university. In Alberta, studies have focussed on Grade XII achievement scores and/or aptitude scores as predictors (Black, 1959, 1960, 1961, 1964, 1966, 1969; Black and Knowles, 1965a, 1965b; Conklin and Ogston, 1968; Evenson and Smith, 1957, 1958; Knowles, 1965). Studies in other parts of Canada are too numerous to list here.

In 1969 a new set of variables entered the field of predicting university success in Canada—the Service of Admission to College and University (SACU) test battery, consisting to date of an aptitude test and a test of English (or French) achievement. The purpose of this study is to examine the SACU variables in relation to other commonly used variables in predicting university success in Alberta.

In the spring of 1969 a sample of Alberta students, enrolled in Grade XII, wrote the Canadian Scholastic Aptitude Test (CSAT) and the Canadian English Language Achievement Test (CELAT). In 1972 a follow-up study was carried out involving students who had enrolled at The University of Alberta.

Purposes

The primary purposes of the study were as follows:

(a) to determine the relationship between SACU test scores and University averages.
(b) to compare SACU test scores with School and College Ability Test (SCAT) scores, Grade XII departmental examinations averages, and averages of school-assigned marks as predictors of University averages.
(c) to determine the effect on predicting University averages of combining two or more of the measures.

Sample

The sample was chosen by selecting students at regular intervals from an alphabetical list of Grade XII students compiled by the Alberta Department of Education. When a name was selected the student was designated for testing only if he or she was in a matriculation program and attending a school situated in the area generally served by The University of Alberta; that is, from Red Deer and north.

A total of 675 names of Alberta students appeared on the computer print-out prepared by SACU. Of these, 306 represented students who subsequently enrolled at The University of Alberta.

Procedure

A list was compiled of students who had written the 1969 SACU tests and later enrolled at The University of Alberta. University grades for first and second year were collected for these students, and in addition Grade XII Departmental Examinations marks and Grade XII marks submitted by the schools were collected. The Departmental Examinations battery included the SCAT, level 1 test, as well as school subject examinations.

The following variables were involved in the processing of the data:

School and College Ability Test, Verbal (SCAT-V)
School and College Ability Test, Quantitative (SCAT-Q)
School and College Ability Test, Total (SCAT-T)
Canadian Scholastic Aptitude Test, Verbal (CSAT-V)
Canadian Scholastic Aptitude Test, Mathematical (CSAT-M)
Canadian Scholastic Aptitude Test, Total (CSAT-T)
Canadian English Language Achievement Test (CELAT)
Grade XII Departmental Examination Average (XII-Dept.)
Grade XII Average of grades submitted by the school (XII-Sch)
First year university grade point average (U-1)
Second year university grade point average (U-2)

Means and standard deviations of these variables were calculated, and a matrix of the intercorrelations was computed. A number of multiple correlations were computed, employing first year GPA (U-1) as the criterion.

Results

Means and standard deviations for the 306 cases are shown in Table 1.

TABLE 1
MEANS AND STANDARD DEVIATIONS OF PREDICTOR AND CRITERIA VARIABLES

	SCAT-V	SCAT-Q	SCAT-T	CSAT-V	CSAT-M
Mean	41.18	43.57	84.78	531.8	556.1
Standard Deviation	7.97	4.80	10.81	91.8	88.7

	CSAT-T	CELAT	XII-Dept	XII-Sch	U-1	U-2
Mean	1088.2	529.0	73.33	62.73	5.59	6.12
Standard Deviation	150.9	98.3	8.03	9.58	1.36	1.17

The matrix of correlations for the eleven variables is shown in Table 2. The number of cases is 306.

TABLE 2
CORRELATION MATRIX OF ELEVEN VARIABLES

	SCAT -Q	SCAT -T	CSAT -V	CSAT -M	CSAT -T	CELAT	XII- DEPT	XII- SCH	U-1	U-2
SCAT-V	386	911	777	304	668	607	490	343	321	242
SCAT-Q		729	290	563	514	309	362	284	151	152
SCAT-T			703	473	721	585	523	378	305	246
CSAT-V				346	833	667	571	441	419	262
CSAT-M					808	295	555	388	135	110
CSAT-T						593	686	507	343	219
CELAT							593	523	483	282
XII-DEPT								773	566	441
XII-SCH									532	456
U-1										762

Decimal points omitted.

Table 3 shows a number of multiple correlations, all of which have grade point average in first year university as the criterion. The multiple correlations are arranged in order of magnitude.

Some of the figures in Table 1 are somewhat unexpected. The mean score for SCAT-Q (43.66) is higher than for SCAT-V despite the fact that the total possible for SCAT-Q is 50 while for SCAT-V it is 60. The low

TABLE 3
RELATIONSHIP BETWEEN FRESHMAN GPA AND COMBINATIONS OF OTHER VARIABLES

Variables	Multiple Correlation	Variables	Multiple Correlation
CSAT CELAT XII DEPT	.608	CSAT V CELAT XII SCH	.589
CELAT XII DEPT XII SCH	.608	SCAT T CSAT T CELAT XII SCH	.584
CSAT V CSAT M CELAT XII SCH	.602	CSAT CELAT XII SCH	.584
CELAT XII DEPT	.595	CELAT XII SCH	.583
SCAT CSAT V CELAT XII SCH	.590	CSAT V CSAT M CELAT	.502
		CSAT V CELAT	.500

standard deviation for SCAT-Q suggests that there is a ceiling effect in operation.

A rather surprising result was the difference between the means of the Grade XII marks on departmental examinations (XII Dept.) and those reported by the schools (XII Sch.). One might expect teachers to be more lenient in giving grades, but the opposite is true. Black and Knowles (1965b) noted a similar effect, with a difference of about one. The difference of over ten points, noted in Table 1, is indeed unexpected.

The most important findings based on Table 2 are as follows:

(a) The best predictors of first year university GPA are Grade XII departmental examinations and Grade XII grades reported by schools. The correlations with university GPA are almost identical.
(b) Of the standardized tests, the best predictor is CELAT, which correlates (.476) almost as high as the two sets of Grade XII scores.
(c) In the SCAT and CSAT tests, the verbal scores are the best predictors of first year university grades.

Table 3 reveals that several combinations of scores yield multiple correlations of about 0.6.

The best pair of predictors, according to Table 3, is CELAT and XII-Dept., however the multiple correlation is not significantly higher than that for CELAT and XII-Sch. It may also be noted that adding other predictors improves the correlation only slightly.

Summary of Findings

1. Mean grades reported by schools average about ten points lower than grades received on Grade XII departmental examinations.

2. Grade XII departmental scores and Grade XII scores reported by schools correlate about equally with first and second year university grade point averages.
3. The single testing instrument that best predicted freshman grade point average was the CELAT. The correlation was only slightly lower than that based on the Grade XII departmental battery or on Grade XII marks submitted by schools.
4. The highest multiple correlations, using freshman grade point average as the criterion, clustered about 0.6. This value could be approached using only two predictors—CELAT and Grade XII departmental grades, or CELAT and Grade XII marks reported by the schools.
5. Validity coefficients were highest for the verbal subtests of the ability tests. This finding does not agree with results reported by Black (1959).

Implications

This study has special implications in view of the decision, by the Alberta Department of Education, no longer to require Grade XII students to write Departmental Examinations.

Grades submitted by schools have been about as effective as predictors of university GPA as Grade XII departmental examinations scores, however, once the "departmentals" are removed there is no guarantee that school grades will continue at the same level as predictors. In the past, schools have had prompt "feedback" regarding the grades that were submitted in June. Once this feedback is removed the criteria for grading might very well change.

The fact that grades submitted by schools were generally lower must also be taken into account.

The number of students who write Departmental examinations will be greatly reduced, thus making it difficult to establish norms of achievement. When large numbers were tested, a relative system of grading was employed. This system cannot be used with a small group unless an "anchor" test is given to at least a representative sample of Grade XII students. This study suggests that the CELAT would be effective.

The study was limited in that no attempt was made to subdivide the sample of students according to university faculty. Subgroups would be too small to serve as a basis for making reliable conclusions. It is quite likely that correlations between predictors and criteria would vary considerably from one faculty to another.

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The Alberta Journal of Educational Research *Vol. XIX, No. 4, December, 1973*

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Canadian Indian Children Who Had Never Attended School

Children from isolated areas may be handicapped on the usual school placement tests. Thirty Indian children, aged 6 to 12 years with little or no formal education achieved scores on the Raven Progressive Matrices, and the performance portion of the Wechsler Intelligence Scale for Children, very similar to thirty non-Indian school children of the same age and similar "socio-intellectual" background. The test scores of a third group of school children from intellectually enriched home backgrounds were significantly higher than either of these groups. Indian children in a residential school made mean scores on the Wechsler Intelligence Scale for Children similar to Group 3. The results of the study appeared to be more related to environmental factors than ethnic ones. (Lolita Wilson is Assistant to the Vice-President (Academic) and Associate Professor of Psychology at Simon Fraser University, Burnaby, British Columbia).

This study was designed to compare the performance on selected intelligence tests of a group of children who had never been to school with the performance of a similar group of children who were attending school regularly.

The initial request for this comparison came from a medical doctor in the Northwest Territories. Many of the Indian children he worked with had had no formal education and it was not likely that their parents would teach them. He was apprehensive about the use of routine achievement tests to assess these children when they did go to school. He was, in effect, interested in the children's ability rather than their formal achievement; in their intellectual potential rather than their ethnic origin.

The effects of marginality on Indian and other children has been the subject of many studies. Bowd (1972) covers the literature thoroughly. However, such children are usually in some type of school. The present study is one of the few in which there are children of school age who have never attended school.

When the study began there were many Indian children in the Charles

Camsell Hospital, Edmonton, Alberta. At least thirty of them, between the ages of six and twelve, had never been to school. Their short-term hospitalization was of a kind which did not affect their intellectual functioning nor did it give them a chance to attend classes in the hospital school. The plan was to compare these children with a similar hospitalized group of non-Indian children who were attending school regularly. A "socio-intellectual" base for matching home backgrounds was substituted for the usual "socio-economic" category.

The tests used were those which do not rely on written or oral language, in this case the Raven Progressive Matrices (1947) and the performance portion of the Wechsler Intelligence Scale for Children (WISC).

The parents of the children in the two hospitalized groups did not appear to have the necessary resources or background to supplement the classroom experiences of the children who were attending school or to make up for the lack of such experiences in the Indian group. On the other hand, the parents of the children from the "intellectually privileged" homes did have these resources. An Indian residential school near Edmonton, in which some of the staff acted as surrogate parents to the children, provided a background somewhere between the intellectually privileged group and the two hospitalized groups.

It was hypothesized that the children from the intellectually enriched home environments would have significantly better means test scores than either of the hospitalized groups. It was also hypothesized that the differences would be greater on the WISC than on the Progressive Matrices, on the assumption that the latter is less culturally loaded. How the two hospitalized groups would compare was the open question.

Subjects

Each group consisted of 30 children, comparable in age and sex, with an age range from 6 to 12 years. Except for the Indian children who had never attended school, each child was in the school grade appropriate to that child's age.

Group 1: Indian children from the Charles Camsell Hospital. This consists of the children who had never been to school.

Group 2: Non-Indian children whose parents were classified as "unskilled workers".

Group 3: Children whose parents were faculty members or professional persons whose level of academic study would be similar to that of a faculty member.

Group 4: Children attending an Indian Residential school. Their test scores on the WISC are included for general interest.

Method

To keep the test administration as uniform as possible all the tests were administered individually by the author. As it had been suggested that some of the Indian children did not understand English, the tests were administered non-verbally. In fact all the children understood spoken English, but the non-verbal administration was continued.

The Progressive Matrices, which are designed for non-verbal administration where necessary, were presented first, followed by the

performance portion of the WISC. The order of the two tests was not alternated because the children, rather than the tests, were being assessed. In effect the two tests were treated as one test with eight sub-tests.

Results

Table 1 gives the mean sub-test and total scores on the Progressive Matrices. Table 2 shows the significance of differences among these mean scores, using a two-tailed "t" test.

There were no significant differences for the total test scores between the two hospitalized groups. On the WISC their scores were very similar in range and variability as well as means. This similarity was not as pronounced for the Progressive Matrices scores.

The children from the intellectually privileged homes had significantly better total scores on both tests and on most of the sub-tests when compared with any of the other groups.

On the one set of scores available, the total WISC performance, the Indian residential children were more like the intellectually privileged group than like either of the two hospitalized groups.

TABLE 1
RAW SCORES OF SUB-TESTS AND TOTAL RAVEN PROGRESSIVE MATRICES (1947)

	Group 1 Indian Hospitalized		Group 2 Non-Indian Hospitalized		Group 3 Intellectually Privileged	
Sub-tests	$\bar{X}$	s.d	$\bar{X}$	s.d	$\bar{X}$	s.d
A	8.23	1.94	9.2	1.67	9.8	1.70
AB	5.76	2.88	6.8	2.58	8.3	3.03
B	3.70	1.89	5.3	2.62	7.8	3.47
Total	17.70	5.98	21.3	6.09	26.06	7.31
Range of Total Scores	9 - 28		12 - 34		11 - 36	

Two subtests were of particular interest. The hospitalized Indian children made significantly lower scores on the WISC picture arrangement sub-test than either of the two non-Indian groups. This may be the most culturally loaded sub-test, reflecting the geographical isolation of the children.

Sub-test B of the Raven Progressive Matrices was also significantly more difficult for the Indian hospitalized group. The test is intended to tap abstract reasoning and may reflect a more formal way of approaching a problem.

TABLE 2
SIGNIFICANCE OF DIFFERENCES BETWEEN MEANS OF SCALED SCORES OF PERFORMANCE SUB-TESTS AND TOTALS—WECHSLER INTELLIGENCE SCALE FOR CHILDREN

Group 1 Indian Hospitalized	Group 2 Non-Indian Hospitalized	Group 3 Intellectually Privileged	Group 4 Indian Residential
Sub-tests	t	t	t
Picture Completion	(Identical mean)	3.6 **	-
Picture Arrangement	4.6 **	9.5 **	-
Block Design	.03	4.9 **	-
Object Assembly	1.66	3.5 **	-
Coding	.40	3.6 **	-
Performance I.Q.	1.02	8.2 **	4.10**
Group 2 Non-Indian Hospitalized			
Picture Completion	-	3.37*	-
Picture Arrangement	-	3.71**	-
Block Design	-	4.42**	-
Object Assembly	-	6.00**	-
Coding	-	5.60**	-
Performance I.Q.	-	6.80**	2.78*
Group 3 Intellectually Privileged			
Performance I.Q.	-	-	4.77**

* Significant at the .01 level ** Significant at the .001 level

Summary

Although the Indian children who were the focus of this study were all of school age, they were unique in having had no formal schooling. As it is not likely that such a situation will exist again for such a large sample of children, the study may add a new dimension to previous work by suggesting the possible influence of home environment regardless of the child's ethnic origin.

The element common to the two hospitalized groups was a home background which lacked both intellectual enrichment and the encouragement to develop formal learning skills.

The element common to the Indian Residential School group and the intellectually privileged group was contact with adults who had had considerable formal education and who could supply the children with enriched opportunities for learning in the time spent away from the classroom.

The study suggests that the potential of the older child entering a Canadian school for the first time can be assessed although the methods require time and specialized training. Given such an assessment, there is a basis for deciding on the amount of time and special attention the child

will need to learn basic skills and to be oriented to a formal learning process.

An understanding of the child's home environment would help in deciding the extent to which the school would need to supplement the child's learning experiences. A "minority-group" or "marginal" background could then be put into a more reasonable relationship with the child's educational process.

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The Alberta Journal of Educational Research *Vol. XIX, No. 4, December, 1973*

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Measured Intelligence, Family Size and Socio-economic Status

A sample of 144 Sydney junior high school children, divided into subgroups according to family size and socio-economic status, was tested on the Henmon-Nelson Intelligence Test. The results demonstrated the existence of a definite relationship between intelligence and socio-economic status, and a significant negative correlation between family size and IQ, except in the two upper socio-economic status groups. These results point to a changing relationship between intelligence and family size. The acceptance of a negative correlation between family size and intelligence must be modified by the realization that socio-economic factors may influence the relationship, and correlations may vary from social class to social class. (Dr. Kennett is Associate Professor of Psychology at St. Francis Xavier University, Sydney Campus).

Scores obtained by children on conventional intelligence tests may be influenced by the size of the family to which each child belongs and these scores apparently reflect, at least, the environmental opportunities available to the members of each family group. In the past, numerous studies (e.g. Bradford, 1925; Cattell, 1936; Scottish Council for Research in Education, 1933, 1949; Mehrotra & Maxwell, 1954; Nisbet, 1953; Sutherland & Thomson, 1926) have reported that large families have an adverse effect on performance on IQ tests. In other words, as the size of the family increases the mean IQ score for family members (i.e. children) decreases. Such findings have led to a generally accepted position that a significant negative correlation exists between measured intelligence and size of family.

In an attempt to understand this relationship better Maxwell (1954, p. 254) considered the possibility of the negative correlation between fertility and intelligence as a function of differences between social classes, but rejected this notion when, upon further analysis of the survey data, a significant negative correlation between IQ and family size remained within each occupational class.

However, other studies of about the same time disagree in part.

Several local studies in American, Canadian, French, German, Norwegian, and Swedish cities have shown that the negative correlation between income and family size prevailed only up to a certain income level (U.N. Department of Social Affairs, 1953). In addition Gille, Henry, Tabah, Sutter, Bergus, Girand and Bastide (1954) and Heuyer, Pieron, Pieron and Sauvy (1950), using data based on 95,237 French elementary school children, found that the negative correlation between intelligence and family size was clearly apparent among farmers, manual labourers, and clerical workers but rarely discernible in the managerial group and negligible in the professional class.

Furthermore, two earlier studies (Kiser, 1942; Kiser & Whelpton, 1944) indicated the usual relationship between socio-economic indices and fertility within a large range of subjects, but reported that this relationship changed from negative to positive in the highest income levels. Thus, it is quite feasible that the negative correlation between IQ and family size is really the outcome of the negative correlation between family size and SES.

However, with changing fertility patterns within SES groups (e.g. Elkin, 1964) such tendencies should be more noticeable. In fact, Douglas (1964), while finding the negative correlation between IQ and family size to persist even when SES groups were held constant, acknowledged that a lower correlation in the upper SES groups (managerial and professional) occurred. Likewise, Nisbet and Entwistle (1967) rejected the relationship between intelligence test scores and family size as just another aspect of the differences between social classes, but also admitted that these two upper SES groups had a lower negative correlation.

In recent years the acceptance of a negative correlation between family size and intelligence has been modified by the realization that socio-economic factors may influence the relationship, and correlations may vary from social class to social class. At the present time, a negative correlation seems to remain between IQ and family size in large, randomly-selected samples, but it would appear that this negative relationship does not hold in at least the upper or professional groups (Carter, in Meade & Parkes, 1966, p. 180), or in predominantly middle-to-upper SES samples (Kennett & Cropley, 1970; Kennett, 1973).

No doubt the trend among modern day families is to plan, with more success, the number of children they wish. Thus, with successful family planning and improved environmental conditions in affluent societies such as Canada, a new relationship between intelligence and family size may emerge. Indeed, with the passage of time, size trends and socio-economic opportunities will change thus influencing the relationship between IQ and family size.

Thus, the purpose of the present study is to investigate, in a middle-class sample of children, the relationship between intelligence and family size in order to ascertain whether or not, within the upper SES groups of the sample, family size has any relationship to how well a child performs on an intelligence test.

Method

Sample

The sample consisted of 144 Grade Nine students enrolled at an urban junior high school (approximately 440 Protestant children enrolled in the

school), situated in a good middle-class residential area in the city of Sydney, Nova Scotia, Canada.

The mean age of the 144 students was 14 years 7 months (SD = 8.3 months; range 18 years 1 month to 13 years 5 months) and they had a mean verbal IQ of 103.2 (SD = 11.6; range 80 to 130). The sample included 74 boys, from whom the mean verbal IQ was 102.3 (SD = 11.6; range 80 to 124), while the corresponding figure for the 70 girls was 104.2 (SD = 11.5; range 83 to 130). The mean age of the boys was 14 years 6 months (SD - 8.7 months; range 18 years 1 month to 13 years 5 months) and the girls 14 years 8 months (SD - 8.1 months; range 17 years 10 months to 13 years 6 months).

Although the sample is predominantly Protestant, the exclusion of Catholics with large families was considered of minimal importance as the differences in family size between Catholics and Protestants are narrowing (Dominion Bureau of Statistics, 1968), such that in 1961, the average Catholic woman of child-bearing age produced 2.87 children while the average Protestant woman produced 2.35 (Dominion Bureau of Statistics, 1968).

Tests

The specific intelligence test used was the Henmon-Nelson Test, Grade Nine to Twelve, Form A, an instrument particularly suited to the measurement of a general intelligence based on verbal skills for children in Grade Nine. The test is given to all Grade Nine children attending school in the city of Sydney.

Socio-economic status was based on father's occupation (Kahl & Davis, 1955; Kennett, 1972).

Procedure

The Henmon-Nelson Test was administered to the Grade Nine sample in January 1971, while father's occupation and family size were obtained from the school Records and confirmed by a brief individual interview with each subject.

On the basis of the information collected, the 144 children were divided into subgroups according to the number of children in their families. Four such subgroups were defined, involving children from one- and two-child families, children from three-child families, children from four-child families and children from families of five or more.

A second distribution of the children was made according to SES (Edwards, 1943; Kennett, 1972). The children from professional and semi-professional homes made up SES group I and II (combined), children from families whose father belonged to the occupational group of lower managerial, salesmen and clerks belonged to SES group III, SES group IV were children of skilled workers (trade supervisors and tradesmen), while the lower two groups of children of semi-skilled and unskilled fathers were pooled to form SES V and VI (combined).

Data Analysis

Differences in mean IQs among socio-economic status groups were tested using the analysis of variance procedure described by Ferguson (1966, pp. 300-323).

Results

The Grade Nine sample of 144 children showed a mean family size of 4.3 (SD = 2.2), while the split for sex showed a mean family size for boys of 4.2 (SD = 2.2) and for girls 4.4 (SD =2.3). The distribution of mean family size within socio-economic subgroups indicated that, within the lowest SES group, family size is still the largest. From highest to lowest SES groups the distribution of mean family size is 4.0, 3.9, 3.5, 4.6, and 5.6.

Analysis of variance showed a definite relationship between intelligence and socio-economic status (F = 3.56, df = 4/139; $p < 0.01$), and further confirmed the numerous studies which have reported a positive relationship between IQ and SES.

TABLE 1
MEAN IQs AND SDs FOR BOTH SEXES AND FOR THE FULL SAMPLE IN RELATIONSHIP TO FAMILY SIZE

Family size		1 or 2	3	4	5 or more
Male	N	11	25	14	24
	Mean	100.5	104.8	99.6	101.9
	SD	11.0	10.9	9.4	13.1
Female	N	14	18	10	28
	Mean	109.9	105.5	106.8	99.6
	SD	11.5	12.1	13.1	8.2
Total	N	25	43	24	52
	Mean	105.8	105.4	103.9	99.8
	SD	12.4	11.6	12.5	10.3

These data satisfy the requirements of within cell homogeneity of variance

(F_{max} = 2.3; df = 4/48)

TABLE 2
SUMMARY OF ANALYSIS OF VARIANCE FOR FAMILY SIZE, SEX AND INTELLIGENCE

Source	Sum Squares	df	Mean Square	F
Sex	49.1	1	49.1	0.38
Family Size	823.0	3	274.3	2.10
Sex x Family Size	703.3	3	234.4	1.80
Within Cell	17,737.0	136	130.4	

Means and standard deviations of IQ scores for the four family groups are shown in Table I, while a summary of the analysis of variance on these data is shown in Table II. The analysis of variance showed that there were

no significant differences between mean IQ for groups of children coming from families of varying size ($F = 2.1$; $df = 4/139$; not significant). However, correlational data for males, for females, and for the full sample, when IQ was examined in relation to family size, showed significance at the 0.05 level for the three groups. The correlations were -0.23, -0.39, and -0.31 for males, for females and for the full sample respectively.

Finally, the relationship between intelligence and family size was calculated for the four separate SES groups, with the mean and standard deviations of family size and IQ for the four SES groups given in Table 3. The correlation coefficients were 0.00, -0.36, -0.42 and -0.36 from the highest to the lowest SES group, respectively.

TABLE 3
MEANS AND SDs OF FAMILY SIZE AND MEASURED INTELLIGENCE FOR THE FOUR SES GROUPS

	Family Size	IQ
SES I & II (N=43)	4.0 (SD=1.5)	107.1 (SD=10.8)
SES III (N=28)	3.5 (SD=1.5)	103.4 (SD=10.4)
SES IV (N=50)	4.6 (SD=2.5)	101.8 (SD=11.9)
SES V & VI (N=18)	5.6 (SD=2.9)	96.4 (SD=9.2)

Discussion

The reporting of a definite relationship, between measured intelligence and socio-economic status, in favour of the high SES groups, added further support to the numerous studies (e.g. Kennett, 1972) claiming a positive correlation between IQ and SES membership.

However, the major finding is centered upon the relationship between IQ and family size. The Grade Nine sample, consisting of 33% from SES I and II, 19% from SES III, 35% from SES IV, and 13% from SES V and VI, resulted in a significant full sample negative correlation (-0.31, $p < 0.01$) between intelligence and family size. Such an overall negative correlation supports the findings of Bradford (1925), Douglas (1964), Nisbet (1953), Nisbet and Entwistle (1967), Scottish Mental Survey (1933, 1949) and Sutherland and Thompson (1926), all of whom, concluded that as family size increases, mean IQ for the family decreases.

On the other hand, an examination of SES groups in relation to IQ and family size reveals that upper SES groups failed to demonstrate the negative correlation reported to exist for the full sample. In this case the insignificant correlation (0.00), based upon a subsample of 48 students with a mean family size of 4.0, suggests that, in at least upper SES groups, no relationship exists. Furthermore, these results hint at the possibility that the negative correlation between IQ and family size is, at least in part, an artifact of SES membership.

Numerous explanations (e.g. Kennett & Cropley, 1970) exist to explain the lack of a significant relationship between IQ and family size in a pre-

dominantly middle- to upper SES sample. For example, upper SES infants receive varied sensory stimulation, more individual adult attention, adequate, and even excellent pre-natal and delivery care and enjoy excellent nutrition and medical facilities. Again such explanations add weight to the argument that family conditions rather than family size is the major contributor to the frequently reported negative correlation between IQ and family size.

Although the relationship between fertility (measured by size of family) and socio-economic status is changing (Elkin, 1964; Westoff in Freedman, 1965), the middle and upper SES families continue to produce smaller families. While the family size in industrial Cape Breton is above the national mean, evident in the present study with a mean family size of 4.3 as compared with the national estimate from the Dominion Bureau of Statistics (1968) of 3.6, the general trend of upper SES groups having smaller families is still confirmed in this Cape Breton sample. As in most samples (e.g. Kennett & Cropley, 1970; Nisbet & Entwistle, 1967) the lower SES groups in the present study have the largest mean family size, while the second-to-lowest SES group contains the second-to-largest mean family size.

Upper SES children perform equally as well on an IQ test irrespective of the size of the family to which they belong. Such a performance, when compared to the negative correlation of IQ and family size in the lower SES groups, supports the belief that the inverse relationship of socio-economic factors with family size suggests a similar inverse relationship between intelligence and family size.

This study was supported by Grant 176, St. Francis Xavier University Research Council, N.S. The author would like to express his appreciation for assistance from Mr. Wilfred Bulter, Woodill Junior High, Sydney.

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The Alberta Journal of Educational Research *Vol. XIX, No. 4, December, 1973*

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The Efficacy of Immediate Knowledge of Results for Tracking Musical Form

The purpose of this study was to discover whether knowledge of results provided by a system of electric response boxes would prove effective for training musically unsophisticated grade VII children to keep track of the forms of unfamiliar classical minuets and movements in sonata-allegro form and to notice the more elementary musical qualities of the movements tracked. A two group "post-test only" experimental design and stratified random sampling procedures were used. The subjects were 43 children in the band program of the Music Education Laboratory.

The findings were that there were no significant differences in either of the tasks being tested. (Dr. Smith is Associate Professor in the Department of Secondary Education, The University of Alberta).

This is a report on the efficacy of immediate knowledge of results provided by means of electric response boxes for developing in musically unsophisticated grade VII children the ability to keep track of the forms of minuets and sonata-allegro movements, and simultaneously to notice more elementary aspects of the music tracked. The material for this report is drawn from a larger study of the feasibility of tracking musical form as a cognitive objective for listening to music.

The decision to investigate this topic resulted from the systematic review of two literatures: one concerning the effectiveness of immediate knowledge of results, the other concerning the objectives of music listening. Whereas the former revealed much agreement as to the effectiveness of knowledge of results for encouraging learning, the latter left much unanswered. Although there is substantial agreement among aestheticians, musicians, and music educators that the most important objective of music listening is the detection of musical form, no literature exists either describing the behavioural implications of such a general objective, or proposing methods for assisting students to accomplish it. In the present study, therefore, one possible behavioural implication of such an objective: i.e., tracking, is postulated, and the effectiveness of one method of providing immediate

knowledge of results: i.e. the use of electric response boxes, for developing that behaviour is tested.

It is important to stress that there is no literature either to support or to deny the central postulate of this study—that detecting musical form involves tracking. A consideration of the temporal nature of music, however, gives strong reasons for this conclusion. Music occurs in time and its form cannot be detected in an instant as can that of a picture. Indeed, music's form—its wholeness—can never be *heard* because the limitations of memory preclude the simultaneous aural awareness of all of its parts. What can be heard, however, is music's *becoming whole* and it is the noticing of this which is taken in this study to be the meaning of detecting form.

In order to provide testable behaviours for this study, two further assumptions were made. Firstly, it was assumed that a listener who is noticing the *becoming whole* of a musical work is aware from moment to moment of the point to which the work has progressed, an assumption which presupposes foreknowledge of what to expect as one listens. Secondly, it was assumed that such a listener would be able, when asked, to name the formal point to which the work has progressed, and that the ability to do this can be taken to be reliable evidence that he is keeping track.

Two tasks were tested in this study: the naming of the formal points to which prematurely terminated minuets and sonata-allegro movements had progressed at the moment of their termination; and the answering, immediately after the point of termination has been named, of true-false questions about briefer elements of each movement. Specifically, the purposes of the larger study were to discover:

1. whether musically unsophisticated grade VII children can be trained to keep track of the unfolding forms of unfamiliar minuets and sonata-allegro movements,

2. whether reinforcement through the use of electric response boxes will facilitate the training of subjects to keep track and/or answer the true-false questions,

3. whether those who keep track can answer the true-false questions more efficiently than those who do not, and

4. whether there is a correlation between keeping track and answering the true-false questions.

While five null hypotheses were formulated for testing in the larger study, only two of these are relevant to the present article.

Hypothesis 1: There is no significant difference between the performances of the control and experimental groups in estimating formal points of termination in the items of the post-tests.

Hypothesis 2: There is no significant difference between the performances of the control and experimental groups in answering the true-false questions on the post-tests.

Before progressing to the main topic of this paper, the findings of the other parts of the main study will be stated.

1. The number of correct estimates of termination greatly exceeded that expected on the hypothesis of equal probability in seventeen of the twenty post-test items.

2. Correct estimators of formal points of termination scored significantly better than incorrect estimators on the true-false questions of three minuets and two sonata-allegro movements. Incorrect estimators scored significantly better on only one item. There were no significant differences between the two groups on the fourteen remaining post-test items.

3. In the case of the minuets— but not of the sonata-allegro movements —a significant relationship was found to exist between the ability to estimate formal points of termination and the ability to answer the true-false questions.

From these findings it was concluded that musically unsophisticated grade VII children could be taught to keep track of the unfolding forms of unfamiliar minuets and sonata-allegro movements with only minimal initiation to the intricacies of music theory, and that tracking unfamiliar minuets seems to improve the listener's awareness of the briefer elements dealt with in the true false questions.

The Review of Literature

The Experimental Method as Programmed Instruction—The experimental method of this study is in some ways comparable to the procedures of programmed instruction which Deterline describes as including:

> the active role assigned to the student . . . . logically sequenced small steps systematically moving to specified goals, immediate knowledge of progress for the student, and self-pacing by the student (1962, p. 4).

Only two of these characteristics are unequivocally accomplished in the present study: the student's active role, and immediate knowledge of results. These are both made possible by the use of response boxes. All of the other characteristics are either unattainable or subject to interpretations which depart from their usual meaning in the context of programmed instruction. "Self-pacing by the student" is, of course, impossible since to permit this would necessitate the alteration of the flow of musical time and constitute a violation of the music itself. The "specified goal" (i.e., knowing from moment to moment the formal point to which a minuet or sonata-allegro movement has progressed) is not the culmination of a succession of small steps moving "to" it, but rather a matter for continuous attainment with the steps being merely check-points in its continuity. While the steps are "logically sequenced", their logic and sequence derive not from subject matter structure but rather from formal progression in music. Furthermore, to speak of the steps as more or less "small" seems less apt than to speak of them as more or less predictable.

Knowledge of Results

Knowledge of results or feedback is a species of reinforcement which has at least two sources for its effectiveness. One is the desire of most learners for the social approval that comes from being told that what they have done is correct. The other is the need for the learner to know how he is doing as he performs a task. The former position is championed by Skinner and is an important premise behind his concept of the teaching machine. The

latter was discovered much earlier by Thorndike in his research involving subjects drawing three inch lines without the aid of measuring instruments.

Knowledge of results can be positive or negative, the subject in the latter case being informed that his response is incorrect. In one sense, such negative feedback can be interpreted as social disapproval. In another sense, it can be seen as the type of information provided in the Thorndike line-drawing study. As Stolurow observes, however, such information will not usually be as effective for shaping behaviour as positive feedback because:

> where there are many possible wrong responses, knowledge that the correct response was made is very informative; however, knowledge that the response was wrong only eliminates that alternative. It may not also indicate to the student the correct response. (1966, pp. 171-172).

The need to provide knowledge of results *immediately after* the response of the subject has occurred has been one of the canons of the advocates of programmed instruction (Schramm, 1964, p. 10). There is, however, sufficient evidence to the contrary to cast doubt upon this principle. On the one hand, Spence has reviewed studies with rats that seem to suggest "that reinforcement will remain effective despite delay, if the subject maintains an orientation both toward the objects that constitute the task and toward the reinforcement agency". (Travers, 1967, p. 88). On the other hand, von Wright's researches with subjects following a path through a maze presented on a moving band of paper demonstrates the efficacy of advance information (Travers, 1967, p. 113).

The question of which type of reinforcer is most effective with human subjects has been researched by Travers (1967, p. 106) who found no significant differences as reinforcers between the words *right* and *wrong,* an electric shock, and a tone of 400 cycles per second. With half the subjects the reinforcement was used for correct responses, with the remainder for incorrect responses. Travers concluded from this and other of his studies that "the characteristic of an event that determines, above all, its reinforcing properties for human subjects is the amount of information it carried".

> If a child is motivated to solve a problem, then the condition in his environment most likely to influence the course of learning is that which provides useful information. The other characteristics of the information source are trivial (1967, p. 107).

In the light of the superiority of the performance of the control group over that of the experimental group in this study, the possibility must be considered that keeping track of musical structure is a self-reinforcing or autotelic activity akin to reading a book (Silberman, 1965, p. 530). The notion of self-reinforcement is, of course, a purely theoretical construct to permit the theory that reinforcement is necessary in *all* learning situations to be maintained by psychologists of that persuasion. It is possible that reinforcement is not always needed for learning to occur.

The EDEX Research

The only study which resembled the present one in its methodology was the EDEX "systems" research of Weisgerber and Rasmussen

(Rasmussen, 1965, and Weisgerber and Rasmussen, 1965). Both studies employed response boxes. Here, however, the resemblance ceases since: 1. the EDEX equipment was intended to give the teacher rather than the subjects immediate knowledge of results; 2. it required the constant halting of the music to permit the asking of questions, response to them, and noting of the class performance by the teacher; 3. the preparation of lessons was scheduled according to a "hypothetical sequence" which the researchers theorize is organized from simple to complex; and 4. questions about form are confined to thematic and non-thematic materials, rondo form, and theme and variations.

Research Design

To test the educational effectiveness of the system of reinforcement used in this study, a two-group "post-test only" experimental design was used: an experimental group taught with the assistance of the response boxes and a control group taught the same content but without the response boxes. This design was employed because the musical naivete of the subjects precluded the use of a pre-test. In their discussion of this design, Campbell and Stanley (1968, p. 65) observe that its principal disadvantage is that although "it controls for testing as main effect and interaction, . . . it does not measure them" as a pre-test—post-test design does. This, however, is not crucial in the present study since the question being investigated is not the amount of effect of the experimental method, but whether it has an effect, and for this purpose the post-test only design is entirely adequate.

Randomization Procedures

One important requirement of the two group "post-test only" design is that the two groups be properly randomized. In this study, randomization was complicated by the requirement that each group be a properly instrumentated band, by considerable diversity in the musical backgrounds of the subjects being used, and by the fact that individual physical handicaps made it impossible to assign all of the subjects to the instruments of their choice. To cope with these factors, it was decided to employ the procedures of *stratified-random sampling* which J. P. Guilford (1965, p. 141) says are "likely to be more representative of a total population than a purely randon sample".

The assignment of the children to instruments was carried out with no thought for randomization, it being assumed that the possession of the physical characteristics desirable for performance on particular instruments would have no implications for the listening skills under consideration in this study. Thus the children were assigned to the several band instruments in sufficient numbers to instrumentate two small bands. As far as possible, the children were given the instruments of their choice. When assignment to instruments was completed, all of the children assigned to the same instrument were studied to ascertain their musical experience and whether or not they had received an instrument of their choice. The children were then paired on the basis of these distinctions and assigned to one or the other of two beginning bands through the use of a

table of random numbers. The two bands were named "Excelsior" and "Foremost" and the latter was assigned to be the experimental group through a further use of random numbers.

The Experimental and Control Groups

The bands which resulted from the assignment procedures described above were quite similar when compared on the basis of sex, age, schools attended (public and separate), and performance on both the *Farnum Music Notation Test* and the *Seashore Measures of Musical Talent.* The overall score for the combined groups on the latter was 53.0% with the control group average being 52.3% and the experimental group average being 53.5%. The overall average score for the combined groups on the former test was 60.9%, a trifle higher than the normal average. Once again, the difference between the two groups on the *Farnum Test* was slight with the control group average score being 62.7%, and that for the experimental group being 59.3%.

TABLE 1

CONTROL AND EXPERIMENTAL GROUP AVERAGE PERFORMANCE ON THE SEASHORE TESTS

	Pitch	Tonal Memory	Time	Rhythm	Timbre	Inten-sity	Overall
Control	58.6	50.8	62.0	56.3	50.8	40.2	52.3
Experimental	59.2	62.8	52.7	49.9	62.9	33.4	53.5
Combined	58.9	56.9	57.2	53.0	57.0	36.7	53.0

The Schedule of the Study

The study was completed in two phases; the first devoted to the study of the minuet taking place during October and November, 1969, and the second devoted to sonata-allegro form taking place between January and March of 1970. All training sessions for the first phase were thirty minutes long and involved a total training time for each group of 210 minutes. During the second phase, both groups received 270 minutes of training. However, while the control group received this in nine sessions of thirty minutes each, the experimental group received it in six sessions of forty-five minutes each. The post-tests were administered at the same time and on the same day of the week as each group had received its training: the control group on a Wednesday and the experimental group on a Saturday.

MELAB—The Setting of the Study

This study was conducted during the 1969-1970 school year in a workshop program of secondary school music teacher training called the Music Education Laboratory (MELAB). The principal reason for using the MELAB facilities rather than a conventional classroom setting was the possibility of randomizing the control and experimental groups in MELAB.

MELAB was inaugurated in 1963 at the Faculty of Education in The

University of Alberta at Edmonton, Canada. All secondary school music majors participate in MELAB during the third year of their university program in lieu of the customary practice teaching in local high schools. During this first involvement in MELAB, the student-teachers collaborate in training beginning bands and orchestras of grade VII children recruited from the public and separate schools of Edmonton. Student-teachers may participate again in MELAB in their fourth year. The fourth year program involves them in training intermediate and advanced bands and orchestras of children who elect to continue in MELAB after grade VII. The student-teachers are counselled and their work is supervised by university staff and master teachers from the local public and separate school systems. MELAB meets every Wednesday between 5:00 p.m. and 7:00 p.m. and every Saturday between 9:00 and noon throughout the university year.

The forty-three children who served as subjects for this study were among a group of eighty grade VII children recruited in September 1969 for membership in the then new beginning band and orchestra programs. Since the number of children asking to play string instruments was smaller than that asking to play band instruments, it was decided to use the latter as the subjects for this study.

Recruiting was done by the student teachers who visited the grade VII classrooms of forty Edmonton schools where instrumental music was not yet taught. There they explained MELAB to the children and distributed applications to those children who expressed interest. The advantage of this procedure is that it gives the chance of first refusal to the child thus precluding applications on behalf of reluctant children by ambitious parents. Around twelve hundred applications were distributed and of these eighty were returned to the university. During the year of this study, all eighty applicants were accepted for membership.

Training Procedures

The purpose of the training sessions was to prepare the subjects to perform two kinds of task when listening to minuets and movements in sonata-allegro form. First, they were to keep track of the unfolding forms of such movements and as evidence of this ability they were to name the formal points of termination when such movements were ended *in medias res*. Second, they were to notice structural and stylistic qualities of the music they track and to give evidence of this ability by identifying as true or false certain statements made about the music they had just tracked.

To prepare the subjects for these tasks, it was necessary to teach them how to track. This was accomplished firstly by providing them with expectations about the things they would hear as they listened to the music: the unfolding of certain formal sections in a predictable order, the kinetic-syntactic qualities of those sections, and the evidences of key change to be noticed in expositions and developments. Secondly, the subjects were assisted in noticing these things as they listened—the experimental procedure to be described shortly. Thirdly, it was necessary to teach a considerable amount of terminology which was usually done incidentally in the course of training how to track. From time to time, cumulative lessons were taught which drew together a topic which had been touched upon frequently in recent sessions.

Selecting the Musical Materials—The musical materials used for both the training sessions and the post-tests were chosen for the regularity with which they conformed to the conventions of the musical forms being studied. As a result, they were selected mainly from late classical repertoire. The formal criteria for selecting sonata-allegro movements included prominent kinetic-syntactic qualities, uncomplicated processes of modulation, the lack of exposition sections of unusual length, repeated expositions, and a variety of overall durations. The criteria employed for selecting the minuets were less demanding since the predominantly sectional nature of such movements rendered key relationships and kinetic-syntactic qualities less crucial to the exercise of tracking skills.

The Experimental Procedure—It is in the methods employed to train the subjects to track that the treatment of the experimental group differs from that of the control group. In both groups, listening was taught in a way that anticipated the procedures of the post-tests. After a prematurely terminated selection had been heard, each subject estimated where it had stopped and then the class discussed non-formal aspects of it. The control group was merely encouraged to keep track as a means of discovering where the music would stop. In the experimental group, however, immediate feedback was provided to each child as to the accuracy with which he had noticed certain formal events in the music. Each child was provided with a small metal box wired individually to one of thirty lights on a panel operated by the teacher. The teacher's panel also had a button, a time-lapse device, and a photo flash. Each child's box had a button and a red and green light.

When a child pressed his button, the light on the teacher's panel lit up, thus informing the instructor of the child's response. At the same time, one of the child's lights became lit depending upon whether his button had been pressed during the time lapse allowed following the instructor's pressure on his button or not. In the former case, the child's green light would glow. In the latter, his red. The photo flash was activated at the end of the time lapse as a signal to those who had failed to respond.

During the earlier listening sessions of each phase of the study, the subjects were told to push their buttons at the beginning of each main section in the work being heard. The teacher also pushed his button on these occasions. The result was that the children who pushed their buttons at the right time saw their green light go on. Those who failed to press their buttons at the right time were informed of the fact by the photo flash. If a button was pressed at any other time, the child's red light glowed. Later in each phase of the study, the subjects were told to press their buttons, not at the beginning of sections, but rather when they noticed (a) a departure in the music from normal formal procedures, (b) the appearance of elements of the new key in a transition, or (c) the recurrence of a theme during development.

Collection and Treatment of the Data

To test the hypotheses of this study, it was necessary to prepare two tapes of ten musical excerpts each—one of minuets, the other of sonata-allegro movements—and two corresponding sets of ten answer forms. The

musical items included on the tapes are to be seen in tables 2 and 3. These are all quite regular examples of the forms they exemplify. Termination points for all excerpts are in the midst of sections rather than at their junctions, thus eliminating any doubt about which section is intended. An effort was made to have all of the excerpts on each tape approximately the same duration while having their points of termination vary widely. This proved to be possible with the sonata-allegro excerpts but not so with the minuets since the overall durations of the latter are very similar.

TABLE 2

POINTS OF TERMINATION AND DURATIONS OF MINUET MOVEMENTS

Excerpt	Duration	Work Excerpted	Formal Point of Termination				
1	0'40"	Wolfgang Amadeus Mozart Eine Kleine Nachtmusik	AA	BAB			
2	1'50"	Franz Joseph Haydn Symphony No. 75 in D+	AA	BABA	CC	DCD	
3	1'04"	Franz Joseph Haydn Symphony No. 54 in G+	AA	BABA	CC		
4	2'40"	Franz Joseph Haydn Symphony No. 87 in A+	AA	BABA	CC	D	
5	2'40"	Franz Joseph Haydn Symphony No. 91 in Eb+	AA	BABA	CC	DC	
6	1'33"	Franz Joseph Haydn Symphony No. 97 in C+	AA	BABA	C		
7	2'55"	Wolfgang Amadeus Mozart Symphony No. 39 in Eb+	AA	BABA	CC	DCDC	
8	2'56"	Franz Joseph Haydn Symphony No. 29 in E+	AA	BABA	CC	DCDC	A
9	2'18"	Franz Joseph Haydn Symphony No. 64 in A+	AA	BABA	CC	DCDC	AB
10	3'12"	Franz Joseph Haydn Symphony No. 102 in Bb+	AA	BABA	CC		

On the answer sheet, an outline of the musical form being heard was provided at the top of the sheet and the five true-false questions near the bottom. The sheets were folded to hide the true-false questions while revealing the formal outline. When the test was administered, before each taped excerpt was played, the appropriate folded answer form was distributed to each subject. The subjects were instructed to listen to the excerpt which they were told would terminate *in medias res*. (They had received ample practice in these procedures during the training sessions.) When the expert terminated, they were told to indicate, on the formal outline, in the midst of which section they believed it to have ended. They were then told to unfold the sheet, answer the true-false questions (guessing

TABLE 3

POINTS OF TERMINATION AND DURATIONS OF SONATA-ALLEGRO MOVEMENTS

Excerpt	Duration	Work Excerpted	Formal Point of Termination
1	2'00"	Mozart. Symphony No. 39 in Eb, 1st movement	1st trans. 2nd
2	1'50"	Mozart. Symphony No. 38 in D, 3rd movement	1st trans. 2nd close 1st
3	1'53"	Haydn. Symphony No. 6 in D, 1st movement	1st trans. 2nd close 1st trans. 2nd close development
4	2'00"	Beethoven. Symphony No.1 in C, 4th movement	1st trans. 2nd close 1st trans. 2nd
5	2'07"	Mozart. Symphony No. 29 in A, 4th movement	1st trans. 2nd close 1st trans. 2nd close
6	2'00"	Mozart. Quartet No. 14 in G, 1st movement	1st trans. 2nd close 1st
7	2'07"	Haydn. Symphony No. 8 in G, 1st movement	1st trans. 2nd close 1st trans. 2nd close development
8	1'40"	Mozart. Symphony No. 29 in A, 1st movement	1st trans. 2nd close
9	2'03"	Mozart. Symphony No. 30 in D, 4th movement	1st trans. 2nd close 1st trans. 2nd close development
10	2'06"	Mozart. Symphony No. 30 in D, 1st movement	1st trans. 2nd close 1st trans.

where necessary), and sign the sheet. The forms were then collected and the folded forms for the next excerpt distributed. Neither of the post-tests took longer than forty-five minutes to administer.

In devising the true-false questions, only characteristics of the excerpts were employed which were clearly present or absent. The areas most fully dealt with were instrumentation, melodic style and movement, dynamics and formal procedures. Since formal terminology was the principal subject matter of the training sessions, an understanding of it was presupposed and some questions were framed in its terms.

The testing of the hypotheses relevant to this article called for tests of the significance of differences between the following pairs of means:

Hypothesis 1. The mean scores of the control and experimental groups in estimating the formal points of termination of the excerpts on the post-test.

Hypothesis 2. The mean scores of the control and experimental groups in answering the true-false questions on the post-tests.

The Findings of the Study and their Interpretation

Findings Related to Hypothesis One—Table 4 presents data related to comparison of the mean performances of the control and exper-

imental groups in estimating the termination points of minuets and sonata-allegro movements. With degrees of freedom of 41 and 39 respectively, in both cases a *t*-ratio of 2.02 is necessary for significance at the .05 level. In neither case is this level attained and the null hypothesis is not rejected.

TABLE 4

COMPARISON OF MEAN PERFORMANCES ON ESTIMATING TERMINATION POINTS

	N	Mean Scores	Standard Deviations	t-ratio
Phase I: Minuets				
Control Group	21	4.38	2.82	1.44
Experimental Group	22	3.36	1.55	
Phase II: Sonata-Allegro Movements				
Control Group	20	3.30	2.12	.911
Experimental Group	21	2.76	1.47	

It is of particular interest to notice that such differences as do exist between these means—sufficient in the minuets for confidence at the .20 level—are in both cases in favor of the control group. While the level of confidence attained is insufficient to justify more than conjecture, it is tempting to speculate from these data that the experimental method, far from being effective for training subjects to estimate termination points accurately, seems to have led them to perform less effectively than the "mere encouragement" used in the training of the control group.

There are at least three possible interpretations that can be placed upon this finding. Firstly, the training of the experimental group may have made them dependent upon the reinforcement of the response boxes, and deprivation of such feedback during the post-tests may have placed them at a disadvantage. It is possible that had they been permitted the use of the response boxes during the post-tests, they might have performed better. It is also possible that they might have performed better had there been a period during which they were weaned from dependence upon the boxes before the post-tests. If the latter is not so, it speaks ill of the response boxes as a teaching method since dependence upon such extrinsic reinforcement can scarcely be considered a desirable condition for the listener in the concert hall. Secondly, it may well be that keeping track is a self-reinforcing activity and that the use of response boxes is an intrusion upon an otherwise efficient self-reinforcing mechanism. Whether this is so, however, cannot at the present time be known since the notion of self-reinforcement is a purely theoretical construct. Thirdly, it is possible that tracking is one of those situations mentioned by Travers in which information given before responding is more useful than information given after. Certainly the cognitive processes which follow

the receipt of information given after a response are more complicated than storing advance information about the correct response, and subjects taught to rely on the latter may enjoy distinct perceptual advantages.

Findings Related to Hypothesis Two—Table 5 presents data related to comparison of the mean performances of the control and experimental groups in making true-false judgments about briefer aspects of the musical excerpts on the post-tests. With degrees of freedom of 39 and 41 respec-

TABLE 5

COMPARISON OF MEAN PERFORMANCES IN MAKING TRUE-FALSE JUDGMENTS

	N	Mean Scores	Standard Deviations	t-ratio
Phase I: Minuets				
Control Group	21	30.33	5.91	.621
Experimental Group	22	31.41	5.16	
Phase II: Sonata-Allegro Movements				
Control Group	20	27.85	3.73	.76
Experimental Group	21	28.86	4.31	

tively, a *t*-ratio of 2.02 is again necessary for significance at the .05 level. In neither case is this level attained and the null hypothesis is not rejected. Such mean differences as exist are this time in favor of the experimental group. These differences are very slight, however, and it is quite unlikely that any real difference in ability to notice briefer durations would be found to exist between control and experimental subjects in a larger sample.

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The Education of Canadian Indians: An In-Depth Study of Nine Families

Education, heritage and culture are highly prized by families involved in this in-depth study of Canadian Indians. The study incorporates a number of relatively unique features; these include interviewing without using tape recorders, analyzing the data by means of content analysis procedures, involving the families in organizing the data, and writing the final report in the first person. Findings and conclusions contain implications for education and society. (Dr. Berger is Professor of Elementary Education, Faculty of Education, The University of Alberta.)

In Canada, the national dropout rate of Indian students between grades one and twelve is 94 percent; for non-Indian students, it is approximately 12 percent (Hawthorn, 1966). In the United States (U.S. Congress, 1968):

> Dropout rates are twice the national average; the level of formal education is half the national average; achievement levels are far below those of their white counterparts; and the Indian child falls progressively further behind the longer he stays in school.

In citing these and other statistics at the Hearings before the Special Subcommittee on Indian Education, the late U.S. Senator Robert F. Kennedy observed:

> These facts are the cold statistics which illuminate a national tragedy and a national disgrace. They demonstrate that the "first American" is in fact the last American in terms of employment, education, a decent income and the chance for a full and rewarding life (*Ibid.* p. 5.).

It is indeed unfortunate for Indians, as well as for the social and economic fabric of two great nations, that greater strides have not been taken to deal with this problem.

What are some reasons for the high dropout rate among Indian children? Can't they learn as well as white children? Don't Indian parents care about education? To find some useful answers, an interdisciplinary, in-depth study involving 40 children and nine families was conducted during the last half of 1971 and the greater portion of 1972.

The two-part study involved children in grades three and four in the Ermineskin School on the Hobbema Reserve. The permission of the reserve's Four Band Council was first obtained. Following a battery of individually-administered tests designed to assess the cognitive strengths of the children, an intervention program was developed on the basis of the test results. This produced significant gains in reading achievement in comparison with a control group of children. The children were using "simultaneous strategies" to solve problems requiring the use of "sequential strategies" (like reading), and *vice versa;* after the intervention program, their test scores increased dramatically.

The part of the study involving the families took place in or near their homes. Five of the families live in the City of Edmonton, one family about five miles west of the city on the Winterburn Reserve, and three about 50 miles south on the Hobbema Reserve. Each family was visited on four occasions. The conversations, which ranged from one to seven hours for each visit, were conducted either in Cree or English.

Before inviting these families to participate, discussions were held with representatives of the Indian Association of Alberta to determine the variables to be considered. The families were then studied with the following variables in mind: whether treaty or non-treaty; Indian or Métis; age of the children; mixed marriage or otherwise; varying levels of income.

The work with the families incorporated a number of relatively unique features. These included interviewing without using tape recorders; analyzing the data by means of content analysis procedures; involving the families in organizing the data; and writing a significant portion of the final report in the first person.

What follows here relates only to the design and rationale, analysis, selected findings and conclusions arising from the work with the nine families.

Design and Rationale

The general design of the study arose naturally from the question:

> What are some of the views and feelings of Indian parents in regard to education, culture, and related matters?

In attempting to answer this question, each family was visited on four separate occasions in or near their home. Information was collected during the first three visits and organized during the final visit.

With nearly every family, except where transportation facilities were not readily available the following pattern of visitations was followed:

Visits	*Visitors*	*Language Used*
First	Berger	English
Second	Berger and Trippe-de-Roche	English and Cree
Third	Trippe-de-Roche	English and Cree
Fourth	Berger and Trippe-de-Roche	English and Cree

Each visit lasted from one to seven hours. An attempt was made not to interrupt the ongoing lives of the families. On the first visit the families were informed that immediately following the interview, the recol-

lections would be recorded, transcribed, and returned to them, in written form, for them to organize on the final visit. To determine the accuracy of the interviewers' recollections, the following reliability exercise was conducted at the start of the study.

There was a conversation with two Indians not connected with the families. This was recorded. Immediately following this conversation interviewers' recollections of it were recorded onto another tape. Both tapes were then transcribed and the transcriptions were given to three independent observers to assess the quality of the *recollected* conversations against the criterion of the actual conversation as recorded. The results of the assessment made by these independent observers indicated a high reliability for this technique.

The conversations, or "interviews," were conducted in a manner suggested by Lewis Dexter (1970) in his book, *Elite and Specialized Interviewing,* and by Alfred Benjamin (1968) who, in *The Helping Interview,* writes:

> I do not see the interviewer as passive in the least. On the contrary, I see him as active at all times. I am not implying that he should talk a great deal, but I am saying that he should make his presence and interest continuously felt. The interviewer is active in gaining as deep an understanding as possible of the interviewee's world. . . . At all times he is active in revealing himself to be a person deeply involved in another person.

A rationale for in-depth studies is provided by David Fox (1969) in *The Research Process in Education.*

> There are mass surveys as to the sociopsychological characteristics of children who ultimately become anti-social as to be legally classified as juvenile delinquents. We know that most often they come from broken homes, that, except for sex offenses, they are more likely to be boys than girls, that their social malfunctioning is accompanied, and usually preceded, by academic malfunctioning, and so on. Yet we still have not learned from this mass survey approach how the different deprivations and difficulties interact so that some children become serious delinquents and others, who exhibit the same characteristics identified by the mass survey, do not. The answer lies in other characteristics yet to be identified, and/or in the pattern of interaction of the characteristics in the individual. It is at this level that the case study approach would function, studying the characteristics as they exist in company with each other within the person and life space of individuals.

Further rationale can be found in the preamble to *Let Us Now Praise Famous Men* (Agee and Evans, 1941) and in the Introduction to *La Vida* (Lewis, 1966).

Content Analysis

On the fourth visit each family engaged in a series of intriguing sorting processes to organize the data obtained during the first three visits. The information obtained during the conversations with each family had been previously subjected to content analysis. The typed recollections were scrutinized to cull each meaningful unit of expression (e.g., Harold Cardinal is a great man). Each of these units was typed on a 3 x 5 card; each family had up to 75 cards. On the fourth visit, then, the family placed each of their own cards into categories of their own creation. That is, they looked at a card, said it was "religion" (for example): the

card was then placed in an envelope on which the word "religion" was written. At the end, some envelopes contained many more cards than did other envelopes; some families had many more envelopes, representing categories, than other families.

The families were engaged in a final sorting process. They took the envelopes bearing the categories and made two piles, one containing items of immediate interest and concern, and the other containing items of lesser interest and concern to them.

With the permission of the families involved, the cards that had been made into the fewest number of categories (six) were exchanged with the cards that had been made into the largest number of categories (39). The intent was to see how many categories each family would make with the other family's data. Family D made 39 categories with their own data and 37 with Family C's data; Family C made six categories with their own data and 10 categories with Family D's data. This result was expected,

TABLE 1

TOPICS OF IMMEDIATE INTEREST AND CONCERN TO THE FAMILIES

Common Categories	Families									Totals	
	A	B	C	D	E	F	G	H	I	**	*
Education	**	**	**	*	**		**	**	**	7	1
Heritage and Culture	**	**	**	**	**		**	**	**	8	
Family	*		**	**	**		**		**	5	1
Indian Organizations	**		**	*					*	2	2
Discrimination	*	**	**	*					*	2	3
Integration			**	**	*			*	**	3	2
Employment	**	*		*	*			*	**	2	4
Treaty Rights	**	**		*	*					2	2
Personal Concerns	*			*				**	**	2	2
Language		**					**		**	3	
Religion	*			*	*		**			1	3
Social Status				*				*	**	1	2
History	*			**						1	1
Communication	*						**			1	1

** Indicates "of immediate interest and concern"
* Indicates "of lesser interest and concern"

[1]Family F did not continue beyond the first conversation for reasons of a personal nature.

[2]Extrapolated from cards and categories made by Family I.

the assumption being that the processing of information is not largely affected by whose information is being processed.

The two interviewers scrutinized the typed recollections to see what was actually discussed during the conversational visits. This was for the purpose of determining whether the families chose to discuss certain topics with the Indian visitor and other topics with the white visitor. Two people also (independently) examined all of the cards in all of the envelopes to form common categories.

Selected Findings

The upshot of the organized data appears in the table showing common categories of immediate interest and concern to the families. Of most immediate interest and concern for most families are education, heritage and culture, and family.

Conclusions

As might be expected a great number of surprising insights were achieved as a result of these visits and conversations. Indians, as other people do, express concern with many of the same problems with which we are concerned. Contrary to the stereotype of the Indian being unconcerned about education, the families in this study talked more about this than about any other topic. They saw education as the way to a better life for their children, and desperately wanted them to succeed in school. One family was distressed about their son who had dropped out of school. The only family that indicated "education" to be of "lesser interest and concern" was one where all the children were grown-up and employed.

In conversations with the families and others, it also appeared that Indian people have special problems that directly affect their education. The boy who dropped out of school is illustrative of the many Indian boys who must leave the reserve after grade nine if they want to continue their education. The fact is that most reserve schools do not go beyond grade nine; many do not go beyond grade six. What this means is that these young people must leave their families and go off by themselves, live in a room in the city, and continue their education. It is a trying experience for those who are unprepared for city life. They may be told which buses to take to get to their school, and how to return, but it is often overlooked that it is also vital information for reservation-reared children to know about how to get on and off the bus, or how to transfer to another bus. Some of the families indicated that their children had found a room with old couples who needed the income but who also needed a degree of quiet that few normal teenagers are able to provide. Such problems often arise in regard to the homes in which these youngsters are placed. Often overlooked, also, is the fact that many Indians are very poor, sometimes owning only one pair of clothes. As a result, some children who go to school in cities or smaller communities have to miss school on wash day.

Many Indian people know these problems, but are not in a position to influence changes. This is because they have very little control over their own education. In the Province of Alberta, which provides some of the best education on this continent thanks to the province's wealth

from oil and natural gas resources, it is not legally possible for Indians to sit on Boards of Education. This is information given by a spokesman for the Department of Indian Affairs.

While most reserves have school committees, many are largely ineffective, with Indians having little or no say about who should teach their children. As a result, one Indian family living on the Hobbema Reserve within sight of Ermineskin School sends their children to school in a nearby "white" community because, the husband explained, many of the children cannot understand some of the foreign-born teachers who speak broken English.

If Indians were permitted a little more involvement in their children's education, they would be better able to point out the need for a useful orientation program to help prepare children who must continue their education in the cities. They could also encourage teachers to visit the homes of their school children.

> . . . teachers would be welcomed in many homes but the Indian people are shy and so the teachers must make the first move. The teachers should take the initiative in expressing interest in visiting homes. She mentioned one teacher who sent notes home expressing his interest. The children gave the notes to the parents and some of the parents invited him to come and visit with them.
>
> —Family H (Hobbema Reserve)

During a classroom discussion about teachers visiting the homes of school children, one teacher working in a northern Indian community said that teachers there tried to visit the homes but the parents refused them. On further questioning, however, it turned out that a carload of teachers came to visit each of the Indian homes. Most white parents would probably be filled with trepidation at the sight of a group of teachers piling out of a car parked in front of their home, unannounced.

Teachers visiting homes—and administrators giving them time to do so—is a controversial idea. This was made clear to me this summer by an Indian woman who had completed an orientation course for teachers of Indian children. She claimed that students were told *not* to visit the homes of Indians because of the possibility to talking about "politics." The fact remains that the "wrong" parents—in the sense that those who come are relatively well informed—tend to go to parent-teacher meetings. Those who do not come are those who, for their children's sakes, need to be reached most urgently. In trying to reach them, it is helpful to remember that many people feel more comfortable in the familiar surroundings of their own homes rather than within the confines of an imposing school building.

The families were relatively unprejudiced about ethnic differences as between teachers and taught.

> I asked her if it is necessary for the teacher of Indian children to be Indian. She felt that the main thing is that the teachers should be good people. The topic of teacher aides came up and she said that it was a good idea to have Indian mothers as teacher aides.
>
> —Family B (Edmonton)

What was striking about Indians along this line is their openness to

share, to accept white people, if only they—the whites—would make the first move.

What happens in most communities is that teachers tend to remain relatively ignorant about the daily lives of the parents and children with whom they are involved. On some reserves, teachers actually cluster together in motel units, with only the braver ones daring to venture out into the culture and the homelife of the people.

The influence of language on thinking and behavior is no secret. As long ago as the 1930s Rudolf Carnap (1937) and B. L. Whorf (1956) studied the influence of language, with the latter observing some of its effects on Hopi Indians. In our study, the effects of language along with other factors were strikingly evident when two families processed each other's data as well as their own. It is very important that fluency and flexibility of language behavior be encouraged.

> Mrs. G. said that TV has helped her children; they pick up English and learn about other people as well.
>
> —Family G (Hobbema Reserve)

During the year of the study I learned that I had some stereotypes about Indians—and that some of these stereotypes had been reinforced by Indians themselves! When I went to hear Kahn Tineta Horn (an outspoken Indian woman, who several years back won the title of Princess in the Canadian Annual Indian Princess Pageant) speak at The University of Alberta, she told of her brothers who were high steel workers, and she indicated that Indian children must have an education that is connected with the outdoors. I was startled, in discussing my findings with Indians and other people, how I also had associated Indians with the outdoor life, completely neglecting to take into consideration that *very few people*—Indians *or* whites—want to be "tied down" to a desk for eight hours a day.

While it may be stereotyped thinking to educate Indians solely for the outdoors, curriculum makers should not overlook the harmonious relationship which Indians tend to enjoy with nature, a relationship which is reflected in much of their talk and writing as well as in their lives. To overlook this relationship is to overlook a vast wealth of resources—to the detriment of Indians and whites alike.

There is much interest now in knowing more about the past and present lives of Indian people.

> Mrs. A commented on her schooling and said they prayed fourteen times a day. I thought this was rather remarkable. She indicated that they prayed when they got up. They had mass before breakfast, they prayed after breakfast and on through the day. They also prayed for the Pope and they prayed for the Communists. She mentioned an arithmetic teacher who had come from Toronto who, she said, "was a real fanatic". Every so often during the day, after they had finished their arithmetic, they would have to get on the floor and say some prayers. She said they also prayed for being sinners. She said she doesn't know how they could possibly have sinned except for the possible sin of everyone thinking they should kill the head nun.
>
> —Family A (Edmonton)

It is good for people to know their own heritage and culture as well as the heritage and culture of others. But the argument is sometimes put forward that, by knowing about one's ancestors and customs, one be-

comes a better person. There may be some truth in this argument. But care must be taken that it does not cloud the fact that people feel good when they accomplish things successfully.

On an airplane trip last summer from New York to Buenos Aires, I sat next to a young man who was born in Italy, grew up in Argentina, then came to New Jersey where, through dint of hard work, he managed to save enough money to open a restaurant; a few years later, at the time of our conversation; he owned a successful restaurant and a house with a swimming pool in New Jersey and a small hotel in Italy. He observed, in broken English, that while he is not able to do many things, there is one thing that he can do better than anyone else in the world—and that is, make the very best pizzas. It seems to me that this is the attitude that must be fostered in schools. Each child must feel, within the realms of his own culture, that he can do something very well. Some may challenge this suggestion on the grounds of a lack of competition among Indians, but what may appear to be a lack of competition is, in reality, politeness on the part of Indians. (It is simply not good manners to show you know answers when others may not know them.) Polite behavior and successful accomplishments can go hand in hand in any culture.

Knowledge of one's own roots is vital, but the fact remains that young people must be able to perform well in school. Knowing one's own culture, while comforting, is not much help to the child who cannot read his books adequately. The books used in most classrooms on this continent are difficult for most children, and the educational problems are aggravated when there are additional potential hurdles like bilingualism and living away from home.

It would be educationally-beneficial for an interdisciplinary team to examine the data derived from this unique in-depth study of nine families and 40 children and then, after interviews with the *children of the families,* develop a meaningful language arts curriculum followed by an in-depth training program for teachers of Indian children.

There are still many questions to be answered; some are vitally relevant to the Indians. One question that still puzzles me is why Indians gave up their language and their religion so readily. True, many now have two marriage ceremonies—one of which is Indian—but most know little about their precious religious heritage, and if I were an Indian I would like to know what happened.

What is also surprising is why Indian leaders have not engaged in a more fruitful public relations program with nearby white communities. In some communities small groups of white children go to school on the reserve nearby, and *vice versa*. But the interaction is very limited. I recall an incident that happened when I drove for the first time alone to the Hobbema Reserve. I stopped at a gasoline station in Wetaskiwin, about ten miles away from Hobbema, filled up, and checked my directions. The teenage white boy was startled: "You're not going to the reserve by yourself, are you?" He told me he had never been to the reserve. That evening, while at the powwow ceremony. I thought of the young man and how much he was missing, even though he lived only ten miles away. In a very real sense *he* was culturally deprived.

There are questions in regard to the psychological impact of the *Indian Act* which have never been properly explored. It is good that Indians receive recompense and reparation for what happened years ago. But what does this inherent paternalism do to the initiative of Indians? Perhaps nothing, but it certainly seems a question worth exploration. For in a very real sense we are all displaced persons. Who among us has not had his roots torn, as if by a shudder of the earth? Who has been able to "hold fast to dreams"? Who has not experienced a sorrow, a loss, and a longing for the past? We are an uprooted people on this planet, and unless we can break the shackles of the past while extracting strength from our heritage we are all of us a lost people hurtling through space.

Acknowledgments

The following are among those whose contributions to the study of nine families should be acknowledged: Georgina Trippe-de-Roche, Linda Halfe and Judy Half Casteel, Vicki Crowchild and Jenny Margetts, Chief Maurice Wolfe of the Ermineskin Band, the Hobbema Four Band Council, and Joseph Couture of the Alberta Indian Education Center. Appreciation is also extended to Les Gue (Department of Educational Administration), Bob Jackson (Department of Elementary Education), J. P. Das and Tom Maguire (both of the Department of Educational Psychology), and Myer Horowitz (Dean of the Faculty of Education and former Chairman of the Department of Elementary Education). The research reported herein was performed pursuant to a contract with the Department of Indian Affairs and Northern Development (Ottawa). The Final Report is available on microfiche through ERIC ED 071 812. Parts of this article appeared in *Elements* and the *Journal of American Indian Education.*

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BOOK REVIEWS

THE PSYCHOLOGY OF THE LEARNING GROUP

By McLeish, J., Matheson, W., and Park, J.
London: Hutchinson University Library, (1973), pp. 221, (Hardcover £3.00; $7.50, Paperback £1.50; $3.75).

This is a welcome addition to the literature on group processes, learning methods and learning experiments. It is of particular interest to anyone concerned with research evidence about teaching methods as it covers a range of investigations carried out at Cambridge and Alberta. It also provides a digest of relevant research reports on learning groups of all kinds—lecture, seminar, "encounter" and others. Essentially this book investigates the claims made by various proponents of small group activity, especially those who support the psychoanalytic, interactionist and behaviourist approaches. The theoretical rationale of these approaches is outlined but the major emphasis of the book is on *outcomes* and *process,* as these are revealed by empirical investigation.

Special aspects of group work are also considered and attention is devoted to evidence relating to teaching qualities which might be relevant to effective work with groups. The final chapter is devoted to a consideration of some reasons why small group learning often fails. The book ends somewhat abruptly at this point.

A full bibliography, a name index and a subject index are supplemented by a glossary. The only critical observations are slight. The glossary details "Conditioning" which is also fully described in the later text. But "T-groups", for example, are not listed. The asterisk technique enables the first use of a term to be located but this does not mean that its meaning is explained.

The main value of this work is that it sets out to examine research evidence bearing on the actual learnings which take place in groups using the null hypothesis in an area where ideologies, mythology, and 'a certain kind of religious faith in groups' abound. The general conclusion is that the original null Hypothesis is not disproved—there is little evidence for the claims made for groups as agents of change. At the same time, evidence is presented that benefits may accrue to those given the opportunity to study the dynamics of the group situation *as observers.*

A.G.J.

PSYCHOLINGUISTICS: AN INTRODUCTION TO RESEARCH AND THEORY

By Hans Hörmann
Berlin: Springer-Verlag, 1971, pp. xii and 377, $18.00 (paperback $12.00)

Certainly one criterion for judging a good book is a reader's simultaneous feelings of professional humility and scholarly stimulation. On completion of *Psycholinguistics,* a reader is likely to feel distinctly humble for what he doesn't know about the psychology of language. He is likely to question, more than ever, the notion that language is a behaviour not unlike other behaviours. Concurrently, the wealth of information in this book will be likely to stimulate numerous testable and unanswered

questions. In short, the book represents one of the most provocative volumes yet published in the burgeoning literature on psycholinguistics. While the book specifically focuses on presenting, and placing in context, the methods and findings of psycholinguistics, it should appeal to anyone seriously interested in understanding the psychology of language in general.

The book is derived from a series of lectures at the Free University of Berlin in 1964-65, when the author was Professor of Psychology. The Translation is by H. H. Stern, Professor of Linguistics, at O.I.S.E. Apart from a few awkward Germanisms, and on p. 285, something called a "primary motor", Stern provides a free flowing and readable translation. The book is divided into fifteen chapters, and numerous subsections within each chapter. Throughout this wealth of information, the author never loses sight of his goal: to present an introductory, detailed review and discussion of psycholinguistic thought and research. The reader is left with the feeling that no item is too small and no issue too insignificant to escape the author's attention. The result is a truly catholic survey of the psychology of language.

Hörmann begins by attempting to delineate the field and define the problems faced by a psychology of language. This he finds impossible to do without taking into account certain philosophical points of view. For example, topics such as "language as sign, symbol and expression", and "characterization of the field in which language becomes possible and necessary" are described and critically analyzed; views such as those of "Saussure, Carroll, Bühler, Langer, Pavlov, Bloomfield, Noble, Osgood" are placed in a definite context with their origins traced and contributions seen in light of their origins. In many ways, these introductory chapters are the most impressive in the book. For Hörmann manages not only to bridge the psychological with the philosophical, but firmly to embed the psychological problems in their philosophical *Weltanschauungen.* The reader is left with a real appreciation of the limitations imposed by historical origins and a greater understanding of the implications of point of view.

The central chapters of the book could well be termed a history of modern behaviouristic methodologies applied to language. A tour through information theory, the probability structure of language, verbal associations, and the mechanisms of association constitute these chapters. Hörmann sheds no new light on these matters. These topics have been well mined, particularly in the English-speaking world. Nonetheless, Hörmann's sense of history and scholarly criticisms render them valuable reading.

The next four chapters are devoted to the problem of meaning. The first presents the philosophical background, concentrating on the works of Pierce, Wittgenstein and Morris. This chapter, I expect, will be turning up in numerous readers. It is a masterful description of the works of these innovators of the new era in psycholinguistics. The second gives an account of the Gestalt point of view, where the context determines meaning, and relates these views to those of Deese. A detailed account of the mediation theories of Mowrer and Osgood, and the relative merits of treating meaning as the result of a conditioning procedure constitute the bulk of the third and fourth chapters.

The last four chapters terminate the book on the same level as the introductory chapters began it. A chapter on the imitation of sounds, and

sound symbolisms, reviews the works of Humboldt, Merleau-Ponty, Werner and Brown. Another looks at Chomsky's generative grammar and the possibilities of testing the psychological reality of grammar. A chapter on the development of language and the relationship of language to thought gives a refreshing airing of the views of Mowrer and Vygotsky. The final chapter is on the Whorfian hypothesis and related problems. In developing the themes of these final chapters Hormann draws on diverse sources. A fortunate byproduct is a kaleidoscope of intriguing topics: a model of bilingualism; semantic satiation; the concept of physiognomy; the concept of recoding; the word as a lure to cognition; colour coding; General Semantics; Lashley's view of the temporal organization of speech events—to name but a few.

I do not want to leave the impression that Hörmann is simply giving us a catalogue. He is not. Each major issue is objectively presented, analyzed in a dialectic manner, and specific and well-documented conclusions are drawn. In fact those who have pet theories may be shocked at some of Hörmann's conclusions: N. J. Johnson has the best model of the psychology of phrase structure rules; Chomskian generative grammar best describes the psychology of generating sentences; Vygotsky has the best model of the relationship of language to thought; Mowrer has the best theory of imitative acquisition. On the other hand, Skinner is given short shrift for his model of language acquisition through delective reinforcement; and Piaget and Werner are seen as vague. Hörmann is certainly not sectarian—in his criticism he covers a wide sampling of schools!

Hörmann's forte is critical analysis. And he hones the dialectic to a fine edge. Unfortunately, this method tends to create an impression that antithetical views are resolved simply because they are so juxtaposed. For example, Hörmann analyzes the Chomsky-Skinner debate with this method. The former is presented as thesis, the latter as antithesis, and the synthesis (a dismissal of Skinner and an integration of Mowrer with Chomsky) could leave the innocent reader with the impression that the issue is resolved; that we are now ready serenely and calmly to advance to a higher level of understanding. That issue is not resolved. Nor do I think it is Hörmann's intention to suggest that it is. He is trying to point out that the relevant issues would be better seen in the light of Chomsky's and Mowrer's views. The fine edge, however, occasionally cuts a wide swath! Fortunately, Hormann remains in control of his material. On re-reading certain issues, and keeping in mind the overall historical trends and topics of analysis, the specific statements made by Hormann are neither simplistic nor misleading—they are the outcome of a critical pursuit of new questions to old answers.

Eric Lenneberg (*Contemporary Psychology,* 1968, *13,* 502) reviewed the German edition of *Psychologie der Sprache.* He concluded that it would make no sense to translate this book, since more than three-quarters of the work is based on English-language publications. This conclusion makes no sense to me. What an author does with materials is more important than their language of origin. Fortunately, Hörmann and the publisher Springer, did not heed Lenneberg's advice. If they had, the English-language world might have missed an original and refreshingly critical statement on a subject which, especially of late, has been treated like a *sanctum sanctorum* by some of the "true-believer" schools of psychology.

Bruce Bain

CUMULATIVE RECORD: A SELECTION OF PAPERS (THIRD EDITION)

by B. F. Skinner

New York: Appleton-Century-Crofts, 1972, $12.95.

This latest edition of *Cumulative Record* includes 48 papers covering a broad spectrum of philosophical, theoretical, educational, therapeutic, methodological, and literary topics. It differs from the second edition through the addition of 18 papers and the removal of two others. The majority of the added papers were actually published in the forties and fifties, and contain some material not previously available in book form. Eight of the 'new lot' are more recent.

Together, the articles provide an excellent summary-picture of the author's work, represented by four decades of rigorous experimentation and debate. A chronological listing of the papers highlights the pre-1960 period of laboratory analysis and the post-1960 period of extrapolation and philosophical argument.

For the experimental scientist (who must constitute the most important segment of Skinner's audience) the more recent articles included in the collection provide nothing new in the way of experimental facts and methods. In place of such scientific information they offer an amalgam of inspirational exhortations, heuristic admonishments, and philosophical speculations.

While Skinner's transition from laboratory scientist to social reformer may be somewhat premature, and even disconcerting to some people, the strength of his position should not go unrecognized. Certainly if one appreciates the breadth and power of the techniques and basic assumptions of Skinnerian experimental analysis, most arguments are consistent and feasible. The author's ability logically to extrapolate from well-documented experiments is unique in its precision.

On the whole, however, this reviewer feels that there is not much in the third edition (with the possible exception of the chapter dealing with the technology of teaching) which really warrants a new publication.

J.F.M.

THE FACE OF EMOTION

By Carroll E. Izard

New York: Appleton-Century-Crofts, 1971, pp. 468, $14.95.

This book provides a complete and valuable summary of the theories, research studies, philosophical issues, and practical problems associated with man's investigation of his own emotions especially as these are related to facial expressions. In the course of an exhaustive survey, the author formulates his own theoretical position. This posits the existence of a system of discrete emotions operating at four distinct levels—neural, behavioural, expressive, and experiential. The final chapters report a series of cross-cultural and comparative studies stimulated by, and providing empirical evidence for this theoretical viewpoint.

This is a valuable source book for those interested in interpersonal and intercultural communication, or in the assessment and management of behaviour in its emotional aspects.

J.F.M.

INSIDE HIGH SCHOOL
By Philip A. Cusick
New York: Holt, Rinehart and Winston, Inc., 1973, pp. 245, $4.15.

Making careful use of the field method of inquiry developed by anthropologists (participant observation) the author reveals a vivid and complex picture of the many facets of student life in a centralized district high school. The emphasis of the easily-digested narrative is on the small group associations formed by the students. It is shown how these strongly affect the teachers' classroom behaviour, extra-curricular activities, the actions of the principal and vice-principal, and the behaviour of other students. The report includes a theoretical discussion and draws out practical implications. An appendix on methodological assumptions provides the rationale of the study and also describes various shortcomings.

The book is exceptional both in its objective reporting of data (subjective impressions are always carefully described as such) and in its recognition of the dangers of over-generalization from a single investigation.

J.F.M.

THEORIES OF COUNSELLING
Ed. by B. Stefflre and W. H. Grant
New York: McGraw-Hill Book Company, 1972, pp. 326, no price given.

This is intended as an informative textbook for educational counselors. The book discusses the place of counseling theory with special reference to school settings. It delineates four important theories currently in use—client-centered theory, trait-factor theory, psychoanalysis, and behaviourism. Contributing authors are Stefflre, Ratigan, Grummon, Williamson, King, Bennington, and Goodstein. The tone of the collection is set in the introduction by W. H. Grant's statement:

> "I cannot rely on science to prove that someone has the potential to be self-directed, I must assume that he does."

In place of science the editors propose a kind of esoteric theoretical eclecticism and quasi-religious faith. For them, there is little real difference in saying that man's behaviour is determined or that it is subject to his own free choice. Statements such as: "We may have to act as if we know when, in fact, we know we do not know" are characteristic.

While the individual contributors discuss vastly different philosophical and "scientific" (or unscientific) positions, the general tone is consistently ambiguous and confusing. If the school or educational counselor requires a clarification of his often-times ill-defined role, he must certainly look beyond Stefflre and Grant.

J.F.M.

PSYCHOLOGY FOR EFFECTIVE TEACHING (THIRD EDITION)
By George J. Mouly
New York: Holt, Rinehart and Winston, 1973, pp. 560, $8.35.

This is an introductory text on educational psychology; its format is traditional. The strength of the text lies in the author's intelligent presentation of the basic facts, principles, theories, and viewpoints of psychology as they relate directly to the operation of the classroom and all that this implies. Each chapter contains a list of practical exercises and supplementary readings selected to complement the materials presented. Generally speaking, the information is a paraphrase of, or bears a close

resemblance to, that found in the original sources. Unfortunately, the text is permeated by a pro-American emotional bias—reflected in simplistic notions of "freedom", "prosperity", and the goals and virtues of a "democratic" society.

J.F.M.

PSYCHOLOGY OF LEARNING AND TEACHING (THIRD EDITION)
By Harold W. Bernard
New York: McGraw-Hill Book Company, 1972, pp. 500, no price given.

This is an introductory textbook of educational psychology. It consists of seventeen chapters, an appendix, and a glossary. The psychological bases of learning and teaching are highlighted. The nature of these processes, and the effects of classroom transactions and problems are the focus of discussion. The assumption inherent in the materials presented is the author's personal conviction that the optimal promise of continuous learning depends on the teacher's ability to accept his own ego-concept and the ego-concepts of his students.

J.F.M.

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